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Plated Copper,
&c.,
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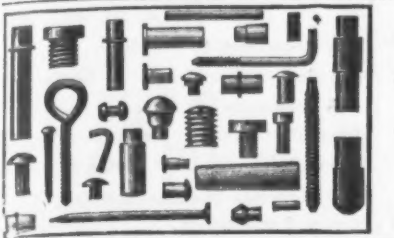


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Best Bloom, Tube, Cleaned, Best Reamed,
Skelp, Blue Annealed and Common.
Particular attention given to Iron for Special Purposes.

**CRIMINAL LAW—FALSE PRETENSES—PUR-
CHASE OF GOODS.**
N. went to B. to buy a lot of cattle, and
in making the purchase he stated to B. that
he was in good financial condition and
would be able to pay when the debt was due.
In fact, he was without means when he
bought the cattle, and could not pay for
them at the time agreed. B. made com-
plaint and procured an indictment against
N. for obtaining goods by false pretenses,
and on trial he was convicted and duly sen-
tenced. N. carried the case—State vs.
Neimeyer—to the Supreme Court of Iowa,
where the conviction was affirmed. Judge
Adams, in the opinion, said: "The charge
of which the defendant complains was as fol-
lows: 'In order to make out the crime here
charged, the State must prove these matters:
1. That the defendant made to B. the repre-
sentations or pretenses substantially as
charged in the indictment, or some of them.
2. That such representations or pretenses
were false and known by the defendant to be
false when he made them. 3. That the
defendant made such representations with
intent by means thereof to induce B. to sell
and deliver to him the property described in
the indictment.' The defendant's position,
as we understand it, is that the facts pointed
out in the instruction as necessary to be
proven by the State would not, if proven,
necessarily show a fraudulent intent, because
such facts might exist consistently with the
intention on the part of the defendant to
pay for the cattle, and that if he did intend
to pay for them his intent was not fraudu-
lent. But in our opinion this position cannot
be sustained. It is the seller's right to
sell to persons who can meet their obligations
at maturity; and when the buyer acquires
the property by reason of statements made
by him to the seller respecting his condi-
tion, to induce the sale, which statements he
knows to be false, he cannot excuse himself
by saying that he intended to pay. Good
intentions cannot supply the place of ability.
It is true, false representations made by the
purchaser do not necessarily show a fraudu-
lent intent. But they do show such intent
if they were designed to induce the sale and
delivery of the property, and the jury in this
case was substantially so charged."

**CORPORATIONS—ORGANIZATION AND OPERA-
TION IN ANOTHER STATE.**
A mining company was incorporated by
the Legislature of North Carolina in Febru-
ary, 1861, and the first meeting of the cor-
poration was held in Baltimore, Md., on
March 5, 1861, and they accepted the charter
at the same place on the following day, at
which time they elected a president, secre-
tary and treasurer, adopted a seal, deter-
mined upon the number and par value of the
shares of capital stock. Nothing whatever
was done under the charter until 20 years
later, in 1882, in North Carolina. In a suit
brought to test the validity of the sale of some
of the stock of one of the stockholders for
failure to pay an assignment—Smith vs.
Silver Valley Mining Co.—the Court of
Appeals of Maryland, through Judge
Miller, decided that the foregoing acts done
out of the State granting the charter were
absolutely null and void, and therefore,
so far as these acts were concerned, no cor-
poration had been created. In the opinion,
he said: "It seems to be well settled by
the weight of authority that directors may
hold meetings, have an office, make con-
tracts and transact a part, at least, of the
general business of the corporation in an-
other State, unless prohibited by local legis-
lation. But the directors, when so acting,
are not the corporate body, but its mere
agents. While the directors may thus act
as agents of the corporation, it has for half a
century been the recognized rule of Amer-
ican law that a corporation can have no
legal existence out of the boundaries of the
sovereignty by which it is created; that it
exists by force of the law, and when that
ceases to operate the corporation can have
no existence; that it must dwell in the
place of its creation and cannot migrate to
another sovereignty, and that it cannot hold
meetings, pass notes or do any corporate
acts, strictly so called, outside of that sov-
ereignty. There is no rule of comity which
requires one State to be made the birth-
place of a corporation chartered by an-
other."

**FRAUDULENT CONVEYANCE—PREFERENCE—
SALE ON MORTGAGE.**
S. & B. were merchants at Howell,
Mich., and they proposed to divide their
stock and sell it in different stores. A
creditor at Detroit, Mich., hearing of this
intention, sent H., an agent, to them to
collect or secure his debt. B. gave the firm
note, secured by a chattel mortgage on the
entire stock, to secure this creditor, whose
claim was \$3516.50. The value of the stock
was about \$6000, but it had shrunk in value,
and after H. had taken possession, because
of some dissension between B. and S., with
S.'s consent he sold it to the creditor for
\$3654, who afterward sold it for the same
price to A., a merchant in an adjoining
town. W., a New York creditor, sued B.
& S., and attached the goods in the hands of
the Detroit creditor, claiming that the mor-
tgage to him was made in fraud of creditors,
but he was defeated, and he carried the
case—Whitfield vs. Stiles—to the Supreme
Court of Michigan, where the judgment was
affirmed. Judge Campbell, in the opinion,
said: "There is no rule of law which will
prevent a debtor from preferring an honest
creditor by mortgage, or from selling out to
him an entire stock of goods, to pay his
debt. And there is no rule of law which
will prevent the creditor from relying on
his mortgage rights if he chooses, as well as
on his bill of sale. All such transactions
must be honest, however, and may be de-
feated if fraudulent. The creditor attacking
such a transfer must make out his case by
affirmative proof, for there is no presumption
of fraud in his favor."

**FRAUDULENT CONVEYANCES—ACTION BY AD-
MINISTRATOR—DEBTS.**
An administrator brought suit to set aside
certain deeds of his testator, as having been
made to defraud his creditors, and on the
further ground that the estate conveyed was

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FOR WATER AND GAS.

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For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

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SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire Boxes, Smoke-Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequalled for
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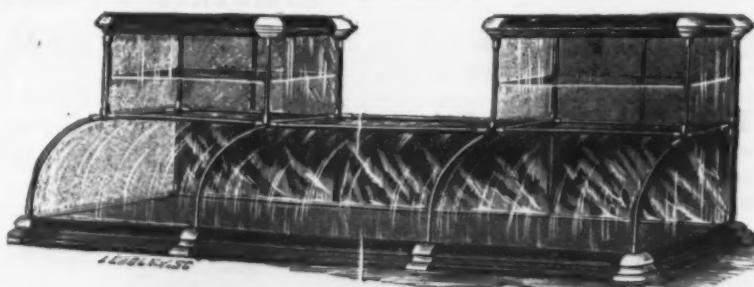
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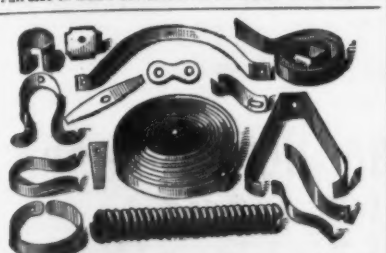
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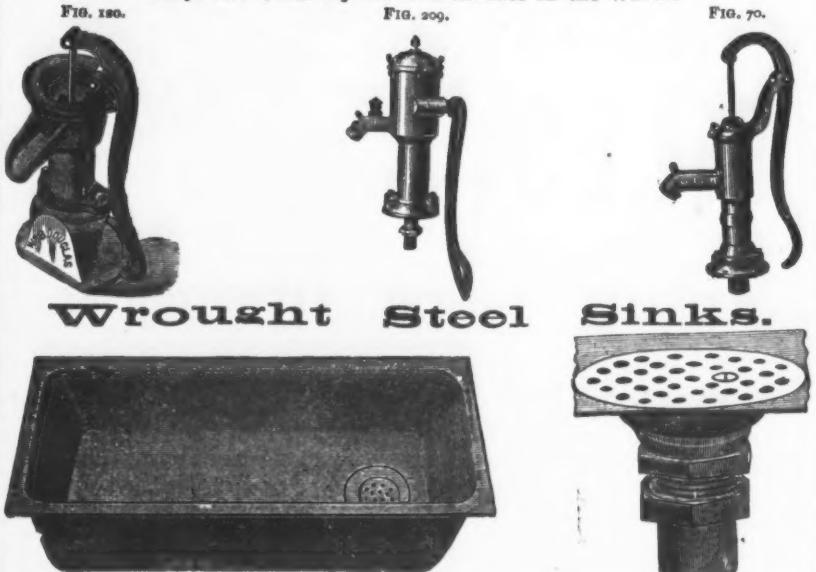
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The Oldest and Most Extensive Manufacturers of
PUMPS, HYDRAULIC RAMS, GARDEN ENGINES.
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Pumps and other Hydraulic Machines in the World.



One of the strong points of these sinks is the new coupling with which they are now supplied
and which is pronounced by all plumbers the best on the market. It is used with both lead and
wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping
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without extra charge.
The fact of the great strength and durability of this sink, as it is practically free from danger of
breakage in transportation, handling or use, is a strong point in its favor, and that its merits are
recognized by most competent judges is evident from the fact that leading houses which have been
interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is
saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada,
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Capacity, 1000 Kegs per Day.
Made from their own Pig Iron, Insuring Regularity and Superiority in Quality.
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IRON AND STEEL DROP FORGINGS

All shapes, small and large, including
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MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to
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For House Doors, Car Doors, Elevator Doors.
Frictionless. Indestructible. Perfect. Send for Circular.
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needed to pay debts. In this case—Estes, Administrator, vs. Howland—the Supreme Court of Rhode Island, through the Chief Justice (Duffee) said: "It is perfectly well settled that an administrator cannot impeach his intestate's conveyances of real or personal property for fraud if the property is not required for the payment of debts. The administrator concedes this, that to the extent of debts he represents the creditors. This is a view prevalent in some of the States, but now generally it is held that the administrator cannot act in such way for the creditors unless he is specially empowered to do so by statute. In this State the administrator is required to put in his inventory 'the goods, chattels, rights and credits of the deceased,' and these do not, in our opinion, include goods, chattels, rights and credits which the deceased has conveyed away in fraud of his creditors. If the deceased has so conveyed his property the creditors are the only proper parties to prosecute the remedy. The claim that he can sue to secure property sufficient to pay the funeral expenses, and the cost of the administration, in any event, we will uphold if he has paid or agreed to pay the burial charges, and he can have the necessary property to give him the means to pay the cost of administration. It seems that he has not put himself under any obligation to pay the funeral expenses, so all he can have by this bill is property to cover the charges of administration."

ORDER FOR GOODS—REFUSAL TO ACCEPT—ACTION FOR DEBT.

L., at Manchester, N. H., gave the agent of C., a dealer in crockery, at Boston, an order for goods in the summer. Early in November, the crockery not having arrived from Europe, L. wrote to C. not to send it until further orders, as he was making some repairs in his store, and C. replied that he would write on the goods coming and would not ship them until he was ready. A week later L. was in Boston and told C. not to forward the crockery until he sent for it. Six weeks after this C.'s agent called on L. and asked him what he was going to do about the crockery, and L. replied that he did not want it then, and that it need not be sent. C. shipped it at once, and L. refused to accept it, and it remained stored at the railway station. Suit was brought for the price of the goods—Clark vs. Labreche—and, the case being carried to Supreme Court of New Hampshire on a point of law, a judgment was entered for the defendant. Judge Blodgett, in the opinion, said: "There being no written contract, the sale being verbal only, it cannot be enforced unless these goods were accepted and received by the buyer. There was no actual acceptance, and if the plaintiff is to succeed a constructive acceptance, which would be sufficient, must be shown. But we cannot see that there was a constructive acceptance here. No act of the seller can effect an acceptance—not even the storage of the goods at a place indicated by the buyer. No acceptance can legally happen, in the absence of a special agreement, so long as the seller keeps his dominion over the goods to retain his lien for the price, for he thereby prevents the purchaser from accepting and receiving them. So, if there is nothing to indicate a surrender of the seller's lien, any acts of control by the buyer will not be an acceptance. There may be cases where the buyer has accepted goods which remain in the possession of the seller, but the seller then holds them not by virtue of his lien as vendor, but under some new contract by which the relations of the parties are changed. The acts of the parties in such cases must be unequivocal, and it must be clearly shown that the vendor holds the goods as the agent or bailee of the other party, and has abandoned all claim of property of every kind to the goods in question."

SCIENTIFIC AND TECHNICAL.**A New Gold-Like Alloy.**

Mr. W. F. Lowe, in a communication to the *Chemical News*, of London, calls attention to the fact that a new alloy, resembling gold in appearance, weight and in withstanding the jeweler's test of strong acids, is being extensively manufactured in England, chiefly, he naively states, for the purpose of defrauding pawnbrokers, to whom articles of jewelry made of it are frequently offered in pledge. Mr. Lowe examined a bracelet that had been sold as gold to a gentleman in Liverpool. After scraping off the gilding, the article had the color of 9-carat gold. It was found on analysis to have the following composition:

	Per cent.
Silver.....	2.48
Platinum.....	33.02
Copper (by difference).....	64.50
Total.....	100.00

He adds that strong boiling in nitric acid, even when the article was left in it for some time, had apparently no effect upon the alloy. The alloy is called "mystery gold."

Lead in Drinking Water.

An examination of the water from a lead pipe 128 feet long, at the Institute of Hygiene, at Pesth, showed the following quantities under varying conditions:

	Mm. per liter.
After long and rapid flow.....	0.095
After long and slow flow.....	1.04
Water standing 24 hours in pipe.....	1.224
Water standing 48 hours in pipe.....	1.7
Water standing seven days in pipe.....	3.25
Water standing one month in pipe.....	4.7

Since 1 liter weighs 1000 grams, 1 mm. per liter represents 0.0001 per cent. by weight. It is stated that 0.7 mm. per liter and above is injurious to health.

Paper to Prevent Tarnishing of Silver Plate.

In a recent issue the *Glass and Crockery Journal* says: "We do not exactly recall the name and address of the party who last year made quite a hit by introducing to makers of and dealers in silver plate a specially prepared paper which was an excellent article to prevent tarnishing. He had a good thing if all the claims made for it were well founded, but if he depended on it as a money-making monopoly he will be grieved to hear that some one has given the thing away. These protective wrappers are

easily made by those who have the care of silver or plated goods depending on them, and they do not cost much. Caustic soda is dissolved in water until the hydrometer—a very simple instrument—shows 20° Beaume. To this mixture is added oxide of zinc until the amount reaches about two-thirds the quantity of caustic soda, and the mixture is boiled until perfect solution is effected. Water is then added gradually to reduce the solution to 10° Beaume. Into this solution summer calico, muslin or paper is dipped, and when dry is ready for use."

Iron or Copper Wire for Telegraph Lines.

Mr. W. H. Preece, electrician to the General Post Office, has investigated the relative merits of iron and copper for telegraph lines. The British Post Office, he said, had recently erected a copper wire from London to Newcastle, 278 miles long, weighing 100 pounds a mile, with a view of testing its value against the ordinary iron wire, which weighs 400 pounds a mile. The mean capacity of the iron wire was 0.0166 microfarad, of the copper 0.0142 microfarad. The resistance of the iron wire was 11.45 ohms a mile; the copper gave 9.21 ohms a mile. The cost of each was about the same. As regarded speed of working, the copper showed a decided superiority, the speeds being, for simplex working—copper 414, iron 345, words a minute; for duplex working—copper 270, iron 237, words a minute. Copper showed itself more susceptible to rapid reversals of electric currents than iron, and hence it was better adapted for fast-speed working and for telephones. The progress made by the Post Office in improving the rate of working of the Wheatstone automatic apparatus was shown by the fact that while in 1877 the rate was 80 a minute, in 1880, 170, and in 1883, 250, it had now reached 430, words a minute.

Meteoric Iron.

Several masses of meteoric iron have been found in the United States, the largest in Arizona, and of less size in California. In the "Mineral Resources" reference is made to one meteorite which was picked up in California many years ago, near the town of Shingle Springs, El Dorado County, the weight of which was about 85 pounds avoirdupois. In 1880 another, weighing 1870 ounces troy, was found in the Ivanpah mining district, San Bernardino County, the surface of the mass being deeply indented with concave depressions. An analysis of this meteorite, made by Mr. Gustav Gehring, showed it to contain:

	Per cent.
Iron.....	94.456
Nickel.....	4.869
Cobalt.....	0.361
Silica.....	0.041
Sulphur.....	0.004
Phosphorus.....	0.002
Carbon in combination.....	0.115
Graphite.....	0.067
Total.....	99.815

Hardness, 2.75; specific gravity, 8.076.

There is now in the State Mining Bureau of California a meteorite weighing 410 ounces troy, which was obtained a few years since from the natives of Portage Bay, Chilcot Inlet, Alaska. General Carleton, in 1861, at Tucson, Ariz., had his attention called to a large meteorite which was there being used as a blacksmith's anvil. This mass, which weighed 632 pounds, was sent by General Carleton to San Francisco, and it is now in the hall of the Pioneer Society. It contains, according to an analysis made by Mr. C. G. Brash:

	Per cent.
Iron.....	81.56
Nickel.....	9.17
Cobalt.....	0.44
Copper.....	0.06
Phosphorus.....	0.49
Silica.....	5.53
Protoside of iron.....	0.12
Lime.....	1.16
Magnesia.....	2.43
Chlorine, sulphur and chromium.....	Traces.
Total.....	99.08

Spontaneous Combustion of Wood.

At a discussion on the spontaneous combustion of wood, before the French Academy, in 1879, M. Cosson described an accident which had occurred in his laboratory a few days before. While the narrator was working in the laboratory a portion of the boarding of the floor spontaneously took fire. The boards were in the vicinity of an air-hole fed with warm air from a stove 4 meters away on the floor below. A similar accident had occurred two years before, and in consequence M. Cosson had the boards adjoining the air-hole replaced by a slab of marble. The boards which now ignited adjoined the marble. The heat to which the boards were subjected was, however, very moderate, being only that of air at 25° C.—77° F. Nevertheless, M. Cosson said the wood had undoubtedly been slowly carbonized. Being thus rendered extremely porous, a rapid absorption of the oxygen of the atmosphere had resulted, and sufficient heat was thereupon produced to originate combustion. The danger thus disclosed, said M. Cosson, is one to which the attention of builders ought to be directed. In the instance in question M. Cosson was able to extinguish the fire with a little water, as he was present and witnessed its beginning; but had it occurred at night, during his absence, it would undoubtedly have completed its work of destruction. M. Fayé stated that at Passy a few days before a similar case of spontaneous fire, due to the action of the warmth from the air-hole of a stove upon the woodwork, had occurred at the house of one of his friends.

W. Swindell, of Allegheny, Pa., is the patentee of a regenerative furnace for consuming natural gas. The furnace is provided with a checker-work arranged in front of the bridge-wall and with air-flues that enter below the checker-work and discharge a portion of their contents into the same. Another portion of their contents is discharged into flues that lead up over the checker-work and enter into the bed-flue at a point beyond the checker-work. The combustion-chamber is arranged in front of the checker-work and is provided with a pipe for supplying natural gas or hydrocarbon liquid to the furnace. The inventor states that, by the use of a second current of heated air induced across the path of the inflowing products of combustion, an extremely soft and intense heat is produced.

Paris, 1878.

**McCAFFREY & BRO.,**

PENNSYLVANIA FILE WORKS,

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For Superiority.



Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

THE CELEBRATED "EUREKA" CLUB SKATE.



PATENTED APRIL 10, 1881.

EUREKA CLUB SKATE

The above cut represents the "EUREKA" CLUB SKATE, the most complete and perfect Skate in the market. The clamps and foot plates are made of steel, the blades of welded steel and iron, tempered expressly for this purpose. When fastening this Skate to the shoe the heel clamps are stationary. The toe clamps are drawn together and the corrugated bar pressed back against the heel simultaneously by one motion of the lever, which is under the instep and cannot by any possibility be thrown out of position while skating, making a most perfect and secure adjustment to the shoe.

Trade Price List: No. 1, Blue Top, per pair, \$5.00; No. 2, Nickel-Plated, 6.00. Discount to the Trade. Sizes, 8, 8½, 9, 9½, 10, 10½, 11, 11½, 12 inches.

"EUREKA" CLUB ROLLER SKATE.

Best All-Clamp Skate



In the World.

The special attention of the Trade is respectfully called to above named new Roller Skate, now being placed in the market. Its simplicity of construction and yet its great strength and the mode of adjusting the same make it the most perfect of all Clamp Roller Skates ever offered. The clamps are operated by a lever simultaneously on both heel and toe, thereby requiring no Key or Wrench. The "EUREKA" CLUB ROLLER SKATE is handsomely nickel-plated, and the rollers are made of the best quality of boxwood and with Brass Bushings, making the skate run easier than any others manufactured. Quality and workmanship considered, the "EUREKA" CLUB ROLLER SKATE has no equal. List, \$7.00 per pair. Address

JOHN H. GRAHAM & CO.,

General Agents, 113 Chambers St., New York City.

LIGHTNING HAY KNIVES. WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO., East Wilton, Franklin Co., Maine.

For sale by the Hardware trade generally.

CAUTION:

We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth, for an improved Hay knife.

The characteristic feature of the invention is a curved blade, provided with saw-tooth cutters, and furnished with suitable working handles. It is our purpose to prosecute all infringers of our patent, and we have already commenced one suit, which is nearly ready for hearing, and are about commencing suits against other parties.

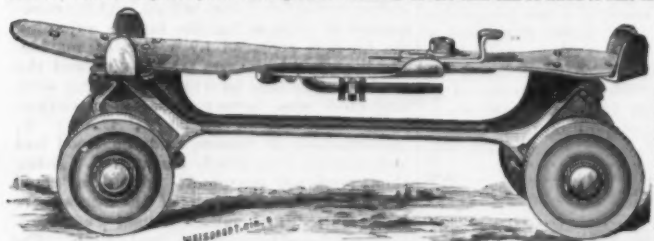
All manufacturers are hereby warned of our rights, and the public are cautioned against purchasing any Hay "Saw Knives" which are not of our genuine manufacture.

HIRAM HOLT & CO.

EAST WILTON, MAY 26, 1884.

ROLLER SKATES.

We are now making our Improved York Patent Steel, Full Clamped, Club Roller Skate, the best in the market, full nickel-plated, with an adjustable tension device that can be fixed to suit the weight of wearer.



The motion is easy and the Skate can turn in a radius of about 20 inches. We are now making a Superior Roller Skate, Steel Plate, with all of the improvements. The latest and most complete Roller Skate out. Send for circular and price list to

YORK MFG. CO., Limited, Portsmouth, Ohio.**RIPLEY & BARTLETT, TACKS**

MANUFACTURERS OF

Swedes and American Iron Tacks of All Kinds.

Having lately withdrawn from the combination, we are at liberty to make such terms and prices as we think expedient. Quality guaranteed the best in the market. Any variation from regular sizes and shapes made to order from samples.

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MASS.**D. S. JENKINS, BROCKTON, MASS.,**

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TACKS, BRADS, ETC.

Being the largest concern outside the combination, we are prepared to supply the Trade with a full line of goods. All goods made from best of stock. Satisfaction guaranteed. Samples sent free. Send for price list. Goods delivered in Boston, New York, Philadelphia, Baltimore and Chicago.

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Cross or Crossing,
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Flat Equaling,
Flat Wood,
Gang Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-End),
Handsaw Taper, single-cut,
Handsaw Taper, double-cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
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BLACK DIAMOND FILE WORKS.**G. & H. BARNETT,**

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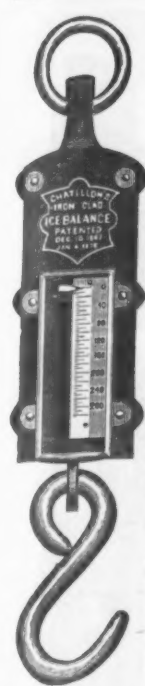
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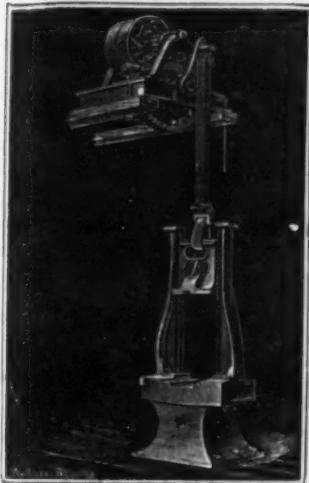
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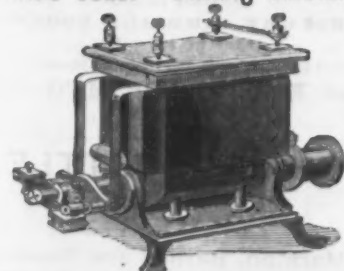
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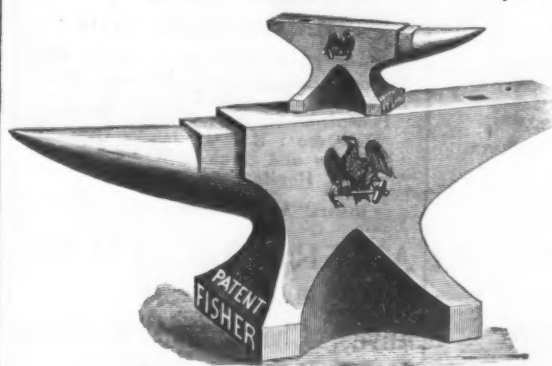


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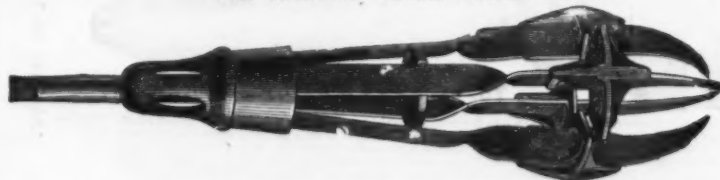
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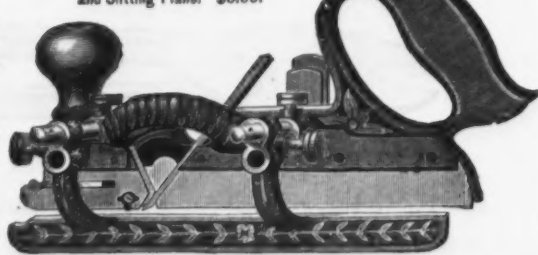
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The Manufacture of Coke.*

BY JOSEPH D. WEEKS.

In this report the word "coke" is used in
a restricted sense, including only that coke
made from bituminous coal in ovens, pits,
ricks or "on the ground," and which, for
convenience, may be termed "oven coke."
"Gas coke," or that which is a residual
product of the manufacture of gas, is not
reported upon. The unit of quantity is the
short ton of 2000 pounds.

**Coal-Fields and Coking Coals of the United
States.**—The coal used in the manufacture of
coke in the United States in 1884 came
chiefly from four of the great coal basins or
coal fields of the country—the Appalachian,
the Illinois, the Missouri and the El Moro,
Colorado. By far the largest part was de-
rived from the measures of the great Appa-
lachian fields, only about 3 per cent. of the
total coming from the Illinois, Missouri and
Colorado basins. In addition to these sources
of supply detached fields furnish a very
small percentage.

The Appalachian basin is the most im-
portant, though by no means the largest in
area, of the coal fields of America. Begin-
ning near the northern boundary of Penn-
sylvania, it extends for a distance of over
750 miles in a southwesterly direction, fol-
lowing the western line of the Alleghany
Mountains, with a course nearly parallel to
the Atlantic coast line, through Western
Pennsylvania, West Virginia, Kentucky,
Tennessee, Georgia and Alabama, to Tusca-
loosa, Ala., where it ends. The average
breadth of the field is from 80 to 90 miles,
the area being fully 70,000 square miles.
The eastern escarpment of the Alleghany
Mountains formed and still forms the eastern
border of this basin, while the great Cin-
cinnati anticlinal hems it in on the west
and separates it from the measures of the
Illinois basin. The eastern line of this field
is comparatively irregular, the basin being
quite broad in its northern area, contract-
ing through Tennessee and Northern Ala-
bama, and expanding considerably at its
termination in Alabama, though it is there
by no means so broad as in Pennsylvania,
Ohio and West Virginia.

In the northern part of this basin the coal
is found in isolated patches, the chief of
which are the Blossburg, McIntyre and Bar-
clay. Between the eastern edge and the
ocean other detached fields are found, such
as the anthracite coal fields of Northeastern
Pennsylvania, the Broad Top semi-bitumi-
nous coal field of Middle Pennsylvania, and
the Cumberland coal basin of Maryland.
These patches are all that have been left
by the denuding agencies which have swept
away so much of the Devonian and silurian
rocks and cut so deeply and sharply, and
at the same time so destructively, into the
measures in this belt of country.

Along nearly the entire length of this
field, from Blossburg, Pa., on the north, to
Birmingham, Ala., on the south, the coke
industry has been established. The ovens,
following the zone of best coking coal, are
generally found near the eastern limits of
the field, hugging the mountains, the coal
in the middle or western part of the basin
being, as a rule, not so well adapted to
coking as that in the eastern. It is also
true that the coal in the upper portion of
this field, as in Connellsville and on the
New River, produces better coke than that
of the southern in Tennessee and Alabama.

The greatest development in the manufac-
ture of coke is in the Connellsville region of
Western Pennsylvania, a small trough 50 or
60 miles long by 3 miles wide. The Connell-
sville coke is regarded as the typical coke of
this country, as the Durham is in England.
Some other sections in this field may produce
a coke equal in purity to the Connellsville,
but as a blast-furnace fuel, which is the use
to which most coke is put, it is so well
adapted, its use is so extensive, and its
characteristics so well known, that it fully
deserves the designation "typical." Coke
is made at other points in Pennsylvania,
especially in the Alleghany Mountain, Alle-
ghany Valley, Blossburg and Broad Top re-
gions, in the Ligonier Valley and near Pitts-
burgh. None of these coals equal the Con-
nellsville. In some cases they are lower in
ash but inferior in physical structure, while
in others washing is necessary to produce a
fuel for blast-furnace use.

miles (a), but they by no means equal the lat-
ter in the character of their coking coal. This
basin occupies the larger part of the State of
Illinois, the southwestern part of Indiana
and the western part of Kentucky. Its
eastern limit is the rocks of the Cincinnati
axis, which separate it from the Appalachian
basin, while its western margin is formed by
the bed of the Mississippi River, which has
been excavated through it and separates it
from the Missouri basin. The beds of coal
in the Illinois field are not as thick as in
either the Appalachian or the Missouri basin,
though their number is about the same as in
the former. "The coals themselves are
more apt to be impure," being high in
sulphur and ash. This is not uniformly the
case, however, as will be evident from an
inspection of the analysis of the Big Muddy
and Cartersville coals of Southwestern Illi-
nois. The coals of the northern part of this
basin in Illinois are as a rule too sulphurous
to make good coke, but in the southwestern
part of the State there are several small
deposits of quite pure coal, which, although
dry-burning, makes a very good coke when
crushed, washed and charged wet. The
character of the coals of this basin and the
difficulty of adapting them to the manufac-
ture of coke are shown in the fact that but
8600 tons of coke were made from them in
the census year.

In Indiana the coals of the "eastern
zone" of Professor Cox's reports, or the
lower measures, are non-coking, being the
well-known block coal of the State, which
can be used raw in smelting iron. The
"western zone," or upper measures, which
are much more extensive than the lower,
contain deposits of good coking coal gen-
erally; however, so far as they have been
tried for making coke, high in ash and sul-
phur.

The coal of that portion of this field lying
in Kentucky, like that part of the Appa-
lachian field lying in the same State, has not
been utilized as yet to any extent for the
manufacture of coke.

The Missouri basin is the largest in area of
all the coal fields of the United States, con-
taining, it is estimated, 84,343 square miles.
It extends through Iowa, Missouri, Nebraska,
Kansas, Arkansas and Indian Territory.
The measures are thinner and contain fewer
beds than the Appalachian. But little coke
was made from the coals of this basin. At
one place in the Indian Territory and in the
Cherokee region of Kansas some little is
made to utilize slack from the mines.

But little is known of the extent of the
coking coal in what I have termed, for want
of a better name, the El Moro (Colorado)
basin, which may be regarded as including
the coal mines of New Mexico. From the
coal mines of the Trinidad region, which
are the highest above the sea level worked
in the country, considerable coke is made for
smelting purposes. At Crested Butte it is
made for the Utah smelters, and in other
portions of the basin coke in small amounts,
usually high in ash, is produced for the local
smelting works. But little is known of the
coals of this section outside of the Trinidad
and Crested Butte regions, except of the
most general character. (b)

Coke was also made in small amounts
from the coals of Montana and Washington,
the latter being the only coke made on the
Pacific Coast. Some coke has been made in
Utah, but none for the past two years.

Statistics of Coke in the United States.—
In the following table are consolidated the
statistics of coking in the United States from
1880 to 1884. From this table it appears
that the number of establishments making
coke in the United States increased from 186
in 1880 to 250 in 1884, an increase of a little
over 34 per cent. The number of ovens
built increased from 12,372 in 1880 to 19,-
557 in 1884, an increase of 58 per cent. The
amount of coal used to make coke increased
from 5,237,741 short tons in 1880 to 7,951,-
974 tons in 1884, an increase of nearly 52
per cent. The coke produced increased
from 3,338,300 short tons in 1880 to 4,873,-
805 tons in 1884, an increase of about 46
per cent. It will be noticed that the coal con-
sumed and coke made in 1883 were both
greater than in 1884. The total value of
coke at the ovens increased from \$6,631,267
to \$7,242,878, an increase of about 9.2 per
cent. The value of the coke produced in
each of the years 1881, 1882 and 1883, how-
ever, was greater than in 1884. The value
of the coke at ovens decreased from \$1.99 in

Statistics of the Manufacture of Coke in the United States, 1880 to 1884, Inclusive.

	1880.	1881.	1882.	1883.	1884.
Number of establishments.....	186	197	215	231	250
Ovens built.....	12,372	14,119	16,356	18,304	19,557
Ovens building.....	1,159	1,005	714	607	812
Coal used, short tons.....	5,237,741	6,546,952	7,577,648	8,516,620	7,951,974
Coke produced, short tons.....	3,338,300	4,113,760	4,731,321	5,464,721	4,873,805
Total value coke at ovens.....	\$6,631,267	\$7,725,175	\$8,462,107	\$8,121,607	\$7,242,878
Value coke at ovens, per ton.....	\$1.99	\$1.88	\$1.77	\$1.49	\$1.49
Yield of coal in coke, per cent.....	63	63	63	64	61

In West Virginia the New River coal fur-
nishes the most and also the best coke.

Analysis shows it to be lower in ash than the
Connellsville, and its producers assert that it
is fully equal to it as a blast furnace fuel,
but this is by no means conceded. In the
northern part of the State, in Tyler, Marion,
Preston and Harrison counties, the coking
industry is assuming some importance. Quite
a number of ovens are already erected and
other buildings. The coke is a fair fuel.

In Ohio most of the coals are coking coals,
but the deposits are much thinner than in
either Pennsylvania or West Virginia, and
generally, though not always, contain an
objectionable amount of sulphur. The coals
are coked only to a limited extent, and the
manufacture of coke is not increasing as
rapidly as in Pennsylvania, West Virginia
and Alabama.

In Tennessee the Sewanee seam furnishes
most of the coke, while in Alabama coals
from both the Warrior (chiefly from the
Pratt seam) and the Cahaba fields were
coked. The extreme eastern outcrop of the
Appalachian basin cuts the northwestern
corner of the State of Georgia, furnishing a
small patch of coking coal, from which some
coke was made in the years covered by this
report.

The coal measures of the Illinois basin
very nearly equal in area those of the Appa-
lachian basin, covering about 47,188 square

1880 to \$1.49 in 1884, a decrease of about 25
per cent.

**Production of Coke in the Census Years
1850-80.**—Until the census of 1880 no thor-
ough and systematic attempt had been made
to collect the statistics of the manufacture
of coke in this country. It is therefore im-
possible to even estimate what was the pro-
duction prior to 1880, except during the cen-
sus years 1850, 1860 and 1870. Coal and
coke are frequently reported together in a
way most provoking to the collector of sta-
tistics, coke being regarded simply as a form
of coal. While it is possible to ascertain the
production of individual works and to esti-
mate that of some sections, no satisfactory
statement of the production for the years
before 1880, except as noted, can be obtained.
In the following table is given a summary of
the totals of the most important items cov-
ered by the census of 1880, compared with
similar results obtained at the censuses of
1870, 1860 and 1850. These figures prior to
1880 must be regarded only as approximates.
The table on page 11 below indicates a most re-
markable growth. It must be remembered
that coke is both bulky and low-priced, and in
proportion to its weight it is one of the lowest,
if not the lowest, priced of any manufactured
article. During the census year 1880 the
average value of a railroad carload of coke,

(a) "Statistical Atlas of the United States,"
page 12. Some authorities make this 98,000.

(b) "Statistical Atlas of the United States,"
page 13.



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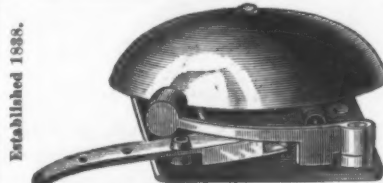
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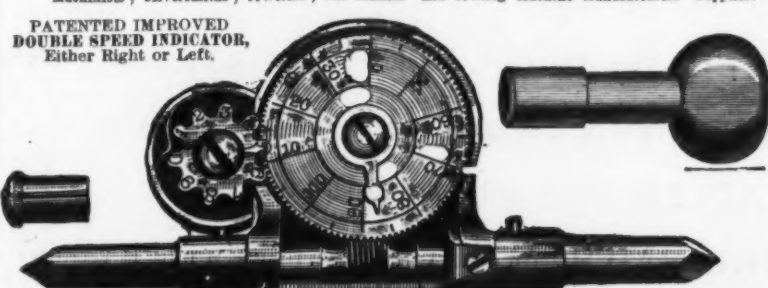
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This Wrench not only combines the superior qualities of a Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, in a making a combination which has no equal.



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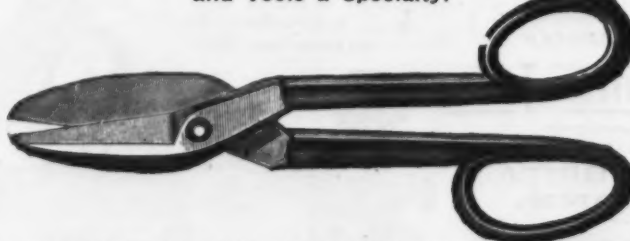
The serrated jaws of the Wrench are interchangeable; that is, the same serrated plate may be used for either the stationary or sliding jaw, so that if one plate is broken another can be furnished adapted to either jaw without express designation. The slides, nuts and various parts are also interchangeable, thus easily repairing the Wrench at very small expense, and with as perfect practicability for further use as when the Wrench was new.

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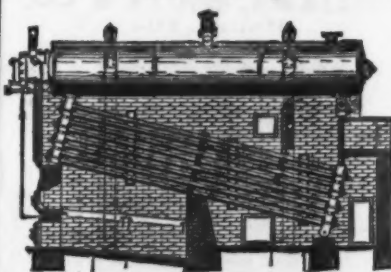
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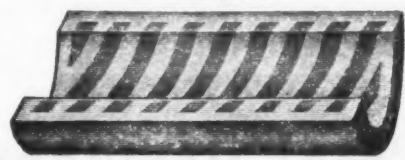
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containing from 12 to 14 tons, was from \$24 to \$28 at the ovens. But little of the coke is used where made, the nearest important point of consumption to the Connellsville region (which produced more than 68 per cent. of all the coke made) being Pittsburgh, about 60 miles distant, while hundreds of thousands of tons are carried to points much further away. The growth of the industry in these years, then, means a growth where the margins of profit must be small and the tonnage handled immense, and the difficulties in the way of its growth, as is always the case with low-priced, heavy articles that must be transported long distances to market, well-nigh insurmountable. To organize and operate effectively the railroad service in connection with this heavy increase of traffic has been of itself no small undertaking. All things considered, the development of the manufacture of coke must be regarded as one of the most marked achievements in our industrial progress.

Census Statistics of Coke.

	1880.	1870.	1860.	1850.
No. of establishments...	149	25	21	4
Number of persons employed...	3,142	528	198	14
Amount of capital, real and personal...	\$5,545,068	\$1,201,048	\$62,300	\$8,700
Wages paid...	1,198,654	288,695	61,368	3,444
Value of all materials used, including coal...	2,905,441	615,268	73,552	6,038
Value of coke produced...	5,350,489	1,182,386	129,844	15,250

Total Number of Coke Works in the United States.—In the following table is given the total number of establishments manufacturing coke in the United States for each year from 1880 to 1884. Each separate coke works, with its ovens and other plant, is classified as an establishment. In many instances it was found that an individual or firm operated several works, sometimes contiguous, in other cases widely separated, but, notwithstanding this joint ownership, each works is regarded as an establishment, and is so classified. It has been difficult, however, in some cases to determine whether works operated by the same owner on adjoining properties should be classified as one or more establishments. In such cases we have taken the judgment of the owner. The number of works, therefore, and the number of separate firms or owners are not the same.

The number of establishments in the country for the years since 1850 for which there are any returns was as follows:

No.	1881, December 31...	No.
1850 (census year)...	4	107
1860 (census year)...	21	215
1870 (census year)...	25	231
1880 (census year)...	149	250
1880, December 31...	186	

In the following table is given the number of these establishments by States. It will be noticed that in 1884, of the 250 works in the United States, 145, or 58.6 per cent., were in Pennsylvania; 27, or 10.8 per cent., in West Virginia; 19, or 7.6 per cent., in Ohio, and 13, or 5.2 per cent., in Tennessee. In each of the other States the number was less than 10:

Number of Establishments in the United States Manufacturing Coke in the Years from 1880 to 1884, by States and Territories.

States and Territories.	1880.	1881.	1882.	1883.	1884.
Alabama.....	4	4	5	6	8
Colorado.....	1	2	5	7	8
Georgia.....	1	1	1	1	1
Illinois.....	6	6	7	7	9
Indiana.....	2	2	2	2	2
Indian Territory.....	1	1	1	1	1
Kansas.....	2	3	3	4	4
Kentucky.....	5	5	5	5	5
Montana.....	0	0	0	1	8
New Mexico.....	0	0	2	2	2
Ohio.....	15	15	16	18	19
Pennsylvania.....	124	132	137	140	145
Tennessee.....	6	6	8	11	13
Utah.....	1	1	1	1	1
Virginia.....	0	0	0	1	1
Washington.....	0	0	0	0	1
West Virginia.....	18	10	22	24	27
Total.....	186	197	215	231	250

The number of establishments in the number December 31 of each year.

Total Number of Ovens Built in the United States.—In the following table is given the total number of ovens built in the United States, and also the number in each State, December 31, for each of the years from 1880 to 1884. In addition to that made in ovens, some coke was made in pits, but as the number of pits varies greatly, depending upon the demand, no attempt has been made to state their total number:

Number of Coke Ovens in the United States on December 31 of Each of the Years from 1880 to 1884, by States and Territories.

States and Territories.	1880.	1881.	1882.	1883.	1884.
Alabama.....	316	416	536	797	976
Colorado.....	300	367	344	359	409
Georgia.....	140	180	230	254	304
Illinois.....	176	176	304	316	325
Indiana.....	45	45	87	37	87
Indian Territory.....	30	30	30	30	30
Kansas.....	6	15	30	23	23
Kentucky.....	45	45	45	45	45
Montana.....	0	0	0	12	5
New Mexico.....	0	0	0	12	70
Ohio.....	616	641	647	682	732
Pennsylvania.....	9,501	10,881	12,424	13,610	14,285
Tennessee.....	650	724	861	962	1,105
Utah.....	30	30	30	30	30
Virginia.....	0	0	0	200	200
Washington.....	0	0	0	0	0
West Virginia.....	631	669	878	962	1,005
Total.....	12,372	14,119	16,356	18,304	19,557

In the years covered by the report the number of ovens has increased from 12,372 in 1880 to 19,557 in 1884, or 58 per cent. The States having more than 1000 ovens each in 1884 are Pennsylvania, with 14,285, or 73 per cent.; Tennessee, with 1,105, or 5.7 per cent.; West Virginia, with 1,005, or 5.1 per cent. The greatest increase in the time covered by the tables is in Alabama, there being in that State 316 ovens in 1880, and 976 ovens in 1884, an increase of 209 per cent. The increase in Pennsylvania has been from 9,501 to 14,285, or 50 per cent.; in Tennessee, from 650 to 1,105, or 68 per cent.; in West Virginia, from 631 to 1,005, or 59 per cent. The number of ovens in Colorado and Georgia has increased a little over 100 per cent., while Illinois, which

had no ovens in 1880, now has 200. Montana and New Mexico, which also had no ovens in 1880, now have ovens. Kansas, which had 6 ovens in 1880, now has 23. In but one State has there been a decrease in the number of ovens (Indiana), but no coke was made in this State in the years covered by the report.

Number of Ovens Building in the United States.—In the following table is given the number of ovens that were actually in course of construction at the close of each of the years from 1880 to 1884. There is no attempt in this to show the increase in the number of ovens each year. It is simply an indication as to the progress of building at the close of each year:

Number of Coke Ovens Building in the United States at the Close of Each of the Years from 1880 to 1884.

States and Territories.	1880.	1881.	1882.	1883.	1884.
Alabama.....	100	130	0	122	242
Colorado.....	50	0	0	0	24
Georgia.....	40	40	44	36	0
Illinois.....	0	0	0	0	0
Indiana.....	0	0	0	0	0
Indian Territory.....	0	0	0	0	0
Kansas.....	0	0	0	0	0
Kentucky.....	0	0	0	0	0
Montana.....	0	0	0	0	12
New Mexico.....	0	0	12	28	0
Ohio.....	35	0	0	0	0
Pennsylvania.....	236	764	642	211	232
Tennessee.....	68	84	14	10	175
Utah.....	0	0	0	0	0
Virginia.....	0	0	0	0	0
Washington.....	0	0	0	0	0
West Virginia.....	40	0	0	0	127
Total.....	1,159	1,005	712	407	812

(To be continued.)

NEW PUBLICATIONS.

MANUAL OF INDUSTRIAL DRAWING FOR CARPENTERS AND OTHER WOOD-WORKERS. By W. F. Decker, Instructor in Drawing in the University of Minnesota. Size 6 x 9 inches, 176 pages, bound in cloth, illustrated. Published by Wm. T. Comstock. Price, \$2.

After very careful examination of this work we are disposed to regard it as one of the most practical, and therefore the most valuable, books on mechanical drawing for the use of apprentices and workmen that has yet appeared. The great majority of books relating to drawing and draftsmanship have left a wide gulf between the theoretical presentation of the subject and what is required in practical every-day work. The present volume is characterized by a directness of method that we have seldom seen equaled. The object of the work, as we gain from the preface, is twofold. It is intended to furnish instruction in the art of making working drawings, and to explain the advantages of such drawings to any who may have occasion to use them. Under the first head everything is supplied from instruction in making rough sketches, such as a foreman would dash off for the guidance of a workman, to the lettering and titles of the best finished drawings prepared by architects. "Drawing Instruments and Materials" are considered, with many practical hints which other authors have neglected; "Definitions and Geometrical Problems" are also discussed, and then follow chapters on "Elementary Projections," "Applications of Projections," "Isometrical and Cabinet Projections," "House Plans" and "Methods of Laying Out Rafters." The author is evidently well informed in the ordinary work of carpenters and builders, as well as in practical draftsmanship. The appendix contains the specification for a frame building.

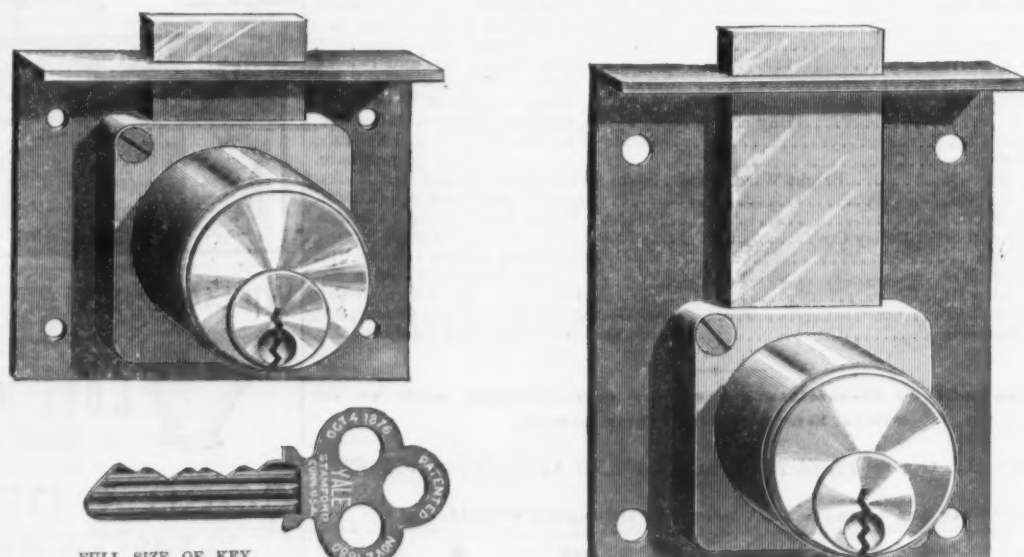
THE AMERICAN ENGINEERING REGISTER. Designed as a means of communication between various classes of engineers, railroad officials, and supply agents and all those merchants, manufacturers, bankers, attorneys, agents and others who desire to place themselves in direct communication with them. By Lewis Haupt. Published by the Engineering News Publishing Company.

A volume of something over 500 pages, bearing the above title, has recently been issued, bearing the double imprint of the Engineering News Publishing Company, New York, and the American Engineering Register, Philadelphia. From the preface we learn that the editor has been induced to make the compilation resulting in this volume in view of the need of some medium of communication between the large and increasing classes of engineers and those who are in need of their services. It is probably the first attempt to gather within a single cover a list of the various classes of American constructors. In addition to the lists of names in which the business or profession of the person is given, together with the school from which they graduated, and the date of their graduation, there is presented a general address to the public, entitled "The Engineer, Who He is and What He Has Done," and also a list of engineering societies. Some tables of formulae for computing quantities, together with tables of weights and measures and other data of general use, are likewise included. The general alphabetical list, which occupies nearly 200 pages, is supplemented by a classified list of architects, army engineers, bridge engineers, civil engineers, contractors, geologists, hydraulic engineers, mechanical engineers, mining engineers, sanitary engineers, surveyors and others. The appendix contains an alphabetical list of railroads and their officials. So far as we can judge from a somewhat casual inspection of the lists contained in this work, they are more correct than usual in such volumes. We understand that it is the purpose of the publishers to issue further editions as time and the progress of engineering interests may make desirable.

WATER METERS. By ROSS E. BROWNE. Size 3 1/4 x 6 inches, 80 pages. Published by D. Van Nostrand. Price, 50 cents.

The above little book, belonging to Van Nostrand's well-known science series, consists of a paper read by Mr. Browne a short time ago before one of the scientific societies of the Pacific Coast, together with some descriptions of meters translated from an article in *Le Génie Civil*, by Ch. André. Special attention is given to a water meter invented by Prof. F. G. Hesse, a series of tests having been conducted with it by the author in connection with some hydraulic experiments carried out at the University of California. These experiments led to comparative tests of the Worth-

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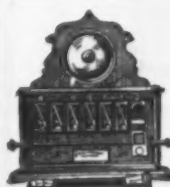
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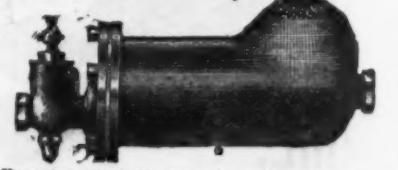
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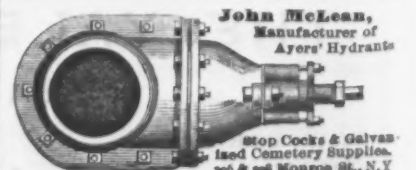
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CALLERS', CARPENTERS', STONE CUTTERS', TIN, COPPER AND BOILER MAKERS'

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Hawking Beetles, Hawking and Calking Irons; also all kinds of Handles, Sledge, Chisel and Hammer Handles.

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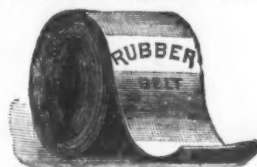
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This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than twelve years; also those for Armour, Dole & Co., of Chicago; Vanderbilt's Elevators for the N. Y. Central & Hudson River R. R.; the great Elevators for the Penna. and Erie Railroads, of Jersey City and Hoboken; Dow's Stores, of Brooklyn, and many others—in fact, the largest Belts for the largest Elevators in the world.

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Circular Woven Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.

"Test" Hose.

Pat. 6545.

Pat. July, 1873.

"Cable" Anti-septic.

Section of Emery Wheel shown.

Patented.

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BUFFALO PORTABLE FORGES AND HAND BLOWERS.




Warranted Superior to any other make, and
Guaranteed to give Perfect
Satisfaction.

For sale by all the leading
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Dealers throughout the country

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Send for Complete Catalogue.




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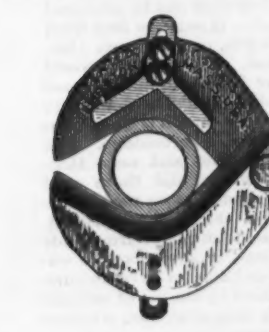
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ANCHOR BRAND
TACKLE BLOCKS
* and **TRUCKS**

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A LEAD PIPE CUTTER

Is just what Plumbers and Tinsmiths have been looking for but never found, until this convenient and almost indispensable tool was invented. It cuts the pipe without either chips or burrs and much quicker than is possible in any other way.

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Fire and Burglar Proof. Also improved ROLLING WOOD SHUTTERS of various kinds, and Patent METALLIC VENETIAN BLINDS.

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THE SCHEIDLER POST HOLE DIGGER.

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Manufacture Safety and Guard Harness Snaps
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If your Hardware Merchant does not keep it, send \$2.50 to the manufacturer, who will forward it by mail. Liberal Discount to the Trade. Send for Circular.

JOHN MATHER, Leominster, Mass.

The "Acme" Lawn Mower AND THE Improved "Easy" Lawn Mower.

The only practical
Forward-Cut
Roller Mowers

ever on the market, combining Durability with extreme Light Weight.

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CHAMPION IRON FENCE CO.,
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SPECIALTIES—Iron Stairs and Jail Work, Builders' and Ornamental Iron Work, and the only manufacturers of Malleable Iron Cresting, guaranteed against breakage; also manufacturers of the Celebrated Ohio Champion Iron Fence and Lift Pumps. Send for 150-page Catalogue.

"Empire" Bronzed Horse Nails.

The Livingston Horse Nail Co.,

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Sole Agents.

THE PARAGON PRUNING SAW,

WITH
Convex and Concave
Cutting Edges.



Patented
April 1st, 1884.

THRUST CUT ON THE CONVEX EDGE.

DRAW CUT ON THE CONCAVE EDGE.

A Fair Trial will Demonstrate that this is the best DOUBLE-EDGED SAW for Trees or Vines.

WHEELER, MADDEN & CLEMSON, Middletown, N. Y.
VIRGINIA NAIL AND IRON WORKS COMPANY,
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NAILS and Bar Iron of Superior Finish, made exclusively from Pig Iron.

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Hammer's Mail. Iron Hand Lamps.



Screw, Kerosene Size.

Hammer's Adjustable Clamps.
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NEW pattern Heavy Screw Clamps; strongest in the market.
For sale by all the principal Hardware Dealers.
Send for Price List.

MALLEABLE IRON CASTINGS
Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,
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PERRINE PATENT
Curved Blade **HOE** Double Shank

Manufactured only by the



CANTON HOE & TOOL CO.,
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GALLOWAY BOILER

IMPROVED UNDER PATENTS OF 1875 AND 1876.

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ARE THE ADVANTAGES OFFERED BY THIS BOILER IN A PRE-EMINENT DEGREE.

3000 Horse-Power in Progress and for Immediate Delivery. Correspondence Solicited.

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STEEL SLABS FOR NAILS.

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Mount Carmel Ox Shoes,

WITH STEEL TOE CALKS.

The Best and Cheapest Shoes Made.

WARRANTED

TO OUTWEAR ANY OTHER SHOE.

Miller's Pat. Forged Ox Shoes.

CORRESPONDENCE SOLICITED.



WOODRUFF, MILLER & CO., Mfrs., Mount Carmel, Conn., U. S. A.

BUCKEYE JUNIOR LAWN MOWER.



Made in Four Sizes: 10, 12, 14 and 16 inch cut. Most reliable Mower in use. Easy to work, strong and durable.

Also manufacturers of the Buckeye Hose Reel and Lawn Sprinkler, Iron Turbine Wind Engines, Buckeye Force Pumps and Buckeye Iron Fencing. Send for Illustrated Circulars to MAST, FOOS & CO., Springfield, O.



Bright Metal Cages, in Brass, Bronze and Silver Plate.

NEW AND BEAUTIFUL DESIGNS JUST OUT.

We also Manufacture Brass and Bronze Show Stands for Fancy Goods. Catalogues Mailed Free.

English Letter.

(From Our Regular Correspondent.)

LONDON, SEPTEMBER 28, 1885.

THE SITUATION

is unchanged in the main, although the steadiness already recorded in these "chronicles of the time" has been fairly well sustained. Speculation has not been very nimble during the week; indeed, some of the buyers for the rise have caused a temporary depression by their covering operations, but there are still a considerable number of enterprising gentlemen who are keeping a very keen eye on the American cablegrams, in order to take advantage of whatever may turn up. In reference to these American advices it may be said that they have been of a rather cheering nature and have encouraged us to look for an advance with you. These cablegrams also seem to be pretty fully confirmed by the latest mail advices from New York, Philadelphia, Pittsburgh, &c.; hence, on the whole, there is a disposition to build upon the near future of the American market. That being so, it need not surprise you to learn that matters display a considerable amount of strength on this side, although, as I have so often had occasion to warn your readers, a due allowance should be made for the reflex action of each market upon the other. Once it is clearly comprehended that this market is waiting upon and will be ruled by yours, it should not be very difficult to gauge the true value of the changes here. That we are really waiting upon you is beyond question, so that all you have to do is to note your own changes in iron, &c., and allow for them only, taking no notice whatever of the fluctuations with us. For instance, within the past few days there has been what is called a "healthier" tone at Glasgow, owing to the American inquiries there; consequently, values are decidedly steadier in certain branches of the Scotch iron trade. This may produce an advance there, which in its turn may be cabled to you, but your people would be very foolish to put another rise thereon, as they would be likely to do, without an adequate explanation of things. All things considered, therefore, I would advise caution and prudence; do not rush to rash conclusions, but await developments as they arise.

THE IRON MARKET

has been steady, on the whole, but has presented very few features of special moment. The previous steadiness appears to be fairly well sustained, but in several branches there is the lull which is usually apparent at the end of the quarter and pending the holding of the quarterly meetings. These gatherings will take place in the second week of October, and bid fair to be of more than ordinary importance, especially if your market should present any developments of interest in the meantime. The speculators who tried to force the market a few weeks since now appear to be a little uncertain what to do to be right, and some of them are quietly clearing out or covering themselves, both of which operations are prejudicial to any further upward movement. The quotations I have lately given are all still nominally current, so that I need not repeat them here. The consumption is quite an average, and in some lines is heavy, but to say that everything wears a roseate hue would be a mistake. At the same time it is beyond question that the more hopeful tone is sustained, and that the minor changes of the time being are all in the direction of advances. The "filling-up" process, in fact, is going on, with what broad results we shall shortly know.

SCOTCH PIG IRON

has been fairly steady since I last wrote, and a moderate amount of business has been transacted in warrants, which are rather higher in value than they were a week ago. As the exact position of Scotch pig is a matter of somewhat more moment just now than ordinary, I give the following detailed particulars, furnished to me by John E. Swan & Bros., Limited, Glasgow, up to September 25:

	Furnaces.				Prices.	
	In blast.	Out.	Basic.	Ordinary.	No. 1.	No. 3.
Lanarkshire brands.*						
Gartsherrie.....	10	0	4	14	46/6	44/
Coltness.....	5	5	12	19	50/	46/
Langloan.....	5	0	7	7	48/	45/
Shotts.....	4	0	1	8	47/	46/
Summerhall.....	3	1	1	5	51/6	48/6
Chapelhall.....	2	0	1	3	46/6	43/6
Carnbroe.....	4	0	1	5	46/	43/6
Clyde.....	2	2	0	4	45/	42/
Qovan.....	0	0	0	5	42/6	40/6
Quarter.....	3	2	1	6	43/	41/
Wishaw.....	0	0	3	3	41/	42/
Monkland.....	4	0	1	5	43/	41/
Almond (store).....	0	0	0	0	47/	44/
Warrants, 3-5 No. 1, 2-5 No. 3, g.m.b., f.o.b. Glasgow.....						
Ayrshire brands.*						
Glenarnock.....	2	2	0	3	71/	46/
Ardeer.....	2	0	3	5	46/	42/6
Eglinton.....	3	0	4	7	48/	45/
Lugar.....	5	0	0	5	48/6	45/6
Muirkirk.....	3	0	0	3	42/6	39/6
Portland.....	3	0	1	4	44/	41/
Dalmellington.....	4	1	3	8	44/	41/
East Coast brands.*						
Carron { Selected Ordinary.....	2	0	2	4	49/6	46/6
Almond.....	0	0	3	5	47/6	44/6
Kinnell.....	0	0	4	4	44/	43/
Lochelly.....	0	0	2	2	44/	41/
Bridgeness.....	0	0	2	2	44/	41/
Lumphinnans.....	0	0	3	2	44/	41/

*Free alongside ship at Glasgow.

Furnaces in blast in Scotland, 1885.....	13 hematite, 1 silicious, 2 basic, 74 ordinary.	September 25, 1884.... 94
		September 15, 1885.... 90
		September 25, 1885.... 90

Shipments for the Week Ending September 19, 1885.			
Tons.	1884.	Tons.	1885.
Foreign.....	8,914	Foreign.....	5,676
Coastwise.....	3,270	Coastwise.....	5,345
Total.....	12,184	Total.....	11,021
Increase in 1885.....		Increase in 1885.....	1,165
Comparative Shipments from December 25 Until September 19.			
Tons.	1885.	Tons.	1884.
Foreign, 201,244, Coastwise, 127,405 = 328,649		Foreign, 202,401, Coastwise, 159,553 = 361,954	
Total decrease in 1885.....			33,305

Monthly Average Prices of Warrants.				
1885.....	Jan.	Feb.	March.	April.
1884.....	42/1 1/2	41/3 1/4	41/3 1/4	41/0 1/2
1885.....	May.	June.	July.	Aug.
1884.....	41/10	41/1	41/1	41/4 1/2
Quantity of Pig Iron in Store at Glasgow, (Connell & Co.)				
Sept. 25.	Sept. 18.	Sept. 11.	Sept. 4.	Sept. 25.
1885.....	624,871	622,402	624,402	570,423 tons.
1884.....	583,757	584,287	584,287	584,138 tons.
Increase for this week.....				
Maximum quantity, June, 1882.....				
At Middlesboro', (Connell & Co.)				
Sept. 25.	Sept. 18.	Sept. 11.	Sept. 4.	Sept. 25.
1885.....	97,162	91,358	91,358	52,419 tons.
Increase for this week.....				
(Exclusive of stocks in makers' yards.)				

From these figures it will be seen that the stocks are still freely increasing, and also that there is a formidable reserve power of production, some of which would be quickly brought into play by any considerable advance in values. Merry & Cunningham have applied for the admission of their new brand of pig Ayrshire M & C to the grade of G. M. B., and their application seems likely to be entertained by the committee of the Pig Iron Trade Association.

MIDDLESBORO' PIG IRON

is fairly steady on the whole, especially in the shipping branch, in which there is a good business doing at the moment—indeed, at this season of the year, when the Northern navigations are likely to be closed by ice at any moment. The termination of the dispute at the Elswick Works of Sir W. G. Armstrong & Co. is welcomed as affording an appreciative measure of relief to various branches of trade which had become congested by the abstention from work of so many men. Current quotations of G. M. B., net cash, f.o.b. at makers' wharves in the Tees, are:

No. 1 Foundry.....	35/6	Mottled.....	31/
" 2 ".....	34/6	White.....	31/
" 3 ".....	33/	Refined metal.....	50/
" 4 ".....	32/6	Kentledge.....	36/
" 4 Forge.....	32/	Cinder.....	30/

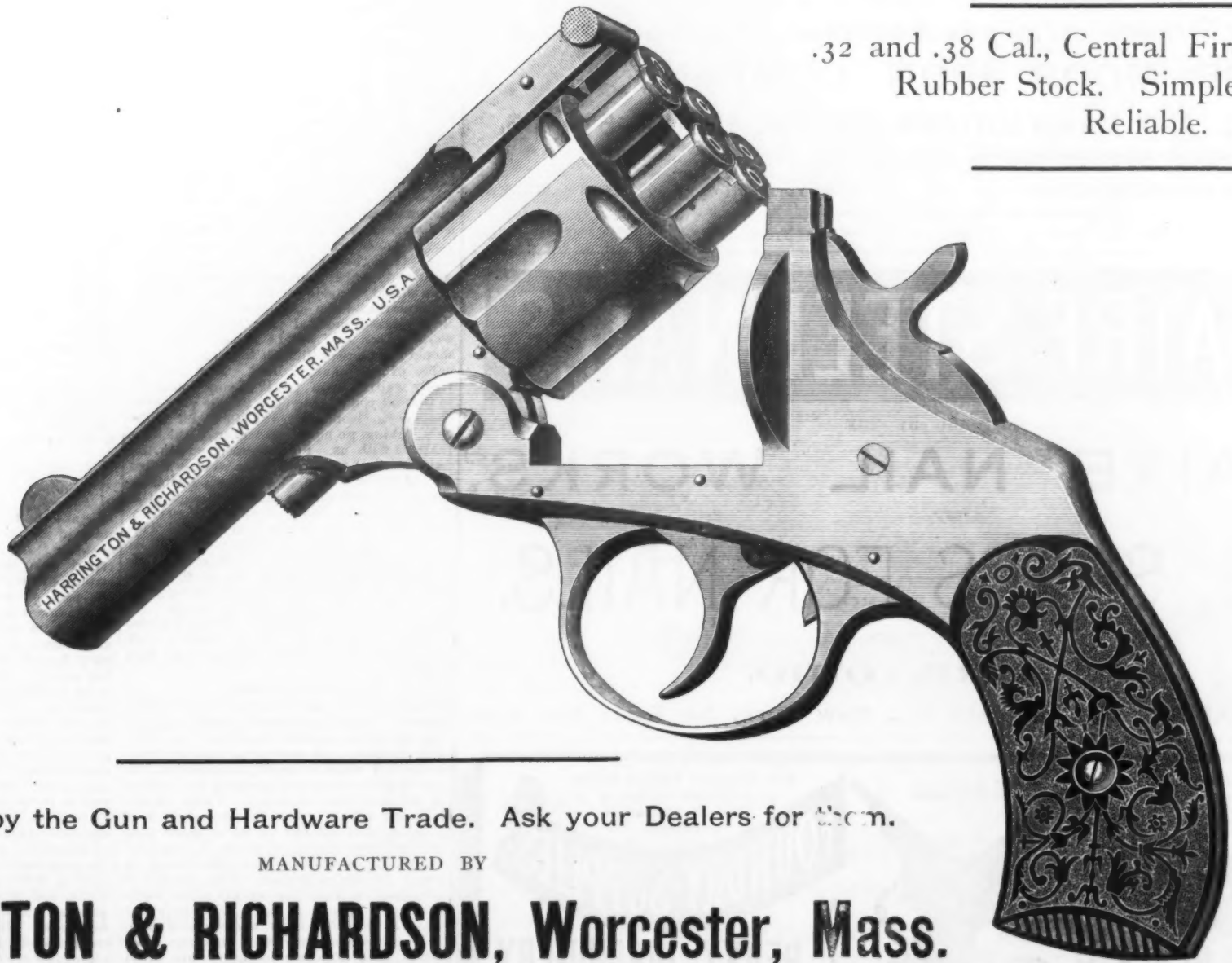
TIN PLATES.

I take the following report of the current state of the tin-plate trade from the *Ironmonger*: "London.—There is nothing new to report this week, the market remaining strong, but without any special activity on the part of large buyers. A few second-hand parcels of cokes have been sold for 14/6, but makers are not open to book except at an advance on this. We quote good ordinary brands IC cokes 14/6 @ 14/6, f.o.b. Liverpool. *Liverpool*.—The market seems to be gathering strength daily. Though inquiries are not very general, yet the few buyers who have them to send out are most anxious to make business. The demand is greatest for Bessemer and Siemens with coke tinning, yet there are a good few inquiries for coke and charcoal tin plates, as well asterne plates. The effect of the last 'stop-week' of the various works has been decidedly good. It has given a better tone to the market and made prices firmer. That the combination will last to the end of the year is now regarded here as beyond a doubt, and it is quite on the cards that it will be renewed for another six months next year. Prices are maintained firmly by most makers, and, in addition, only limited quantities are quoted for, even when the inquiries are for big lines. An unusually large number of special sizes is being asked for. Coke tins in ordinary kinds could be freely sold for 14/ IC, with 14/3 @ 14/6 IC for other brands. Coke-tin wasters are more scarce, and there is a better demand for certain qualities at from 13/ to 13/6. Bessemer steels, generally speaking, fetch 14/6 @ 14/9 IC for good brands, and Siemens-steel plates 15/ @ 15/3 IC. A still further advance is calculated on from this to quarter day, or at any rate by that time. There is a great deal of business in hand, which, if not pulled through before then, must be concluded on that day. Charcoal tins are variously quoted at from 16/ to 17/6. Terns are saleable at 13/6 @ 14/6."

The vast scheme of a railway route from London to Bombay is being discussed by eminent French and British engineers. According to statements made the whole of the journey will be accomplished by train, save the passage of the Channel and the crossing

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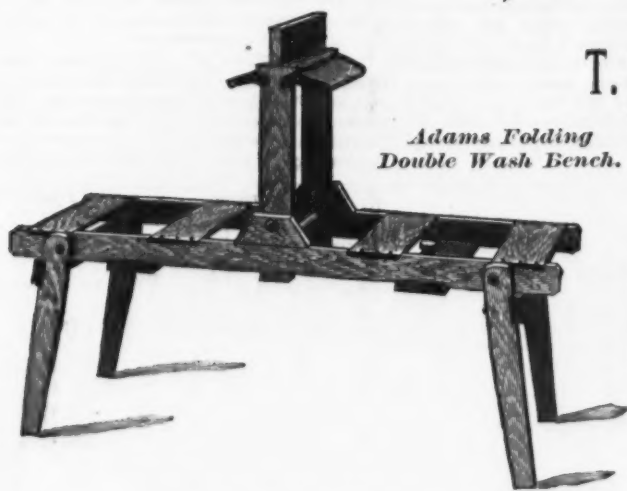
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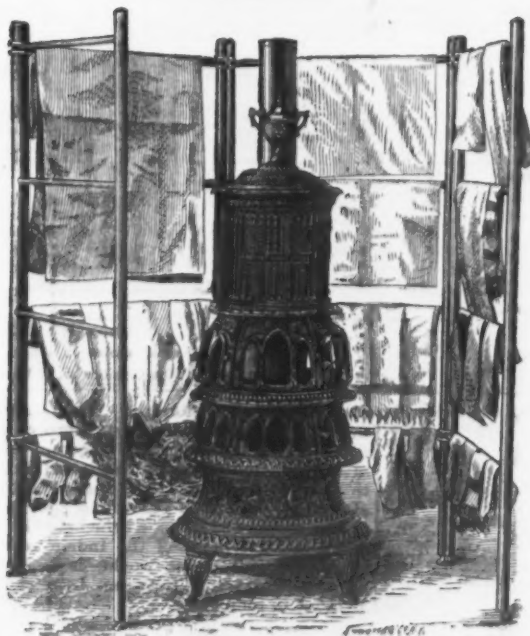


Cyclone Mouse Trap.
PATENTED NOV. 6, 1883.

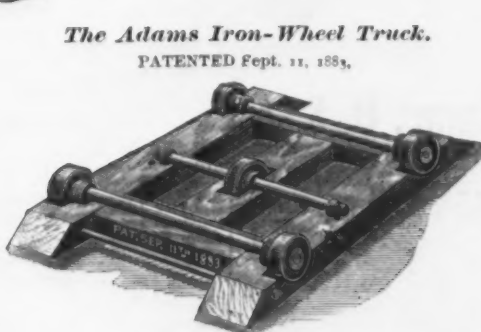
200,000 SOLD SINCE JAN. 1, 1884.



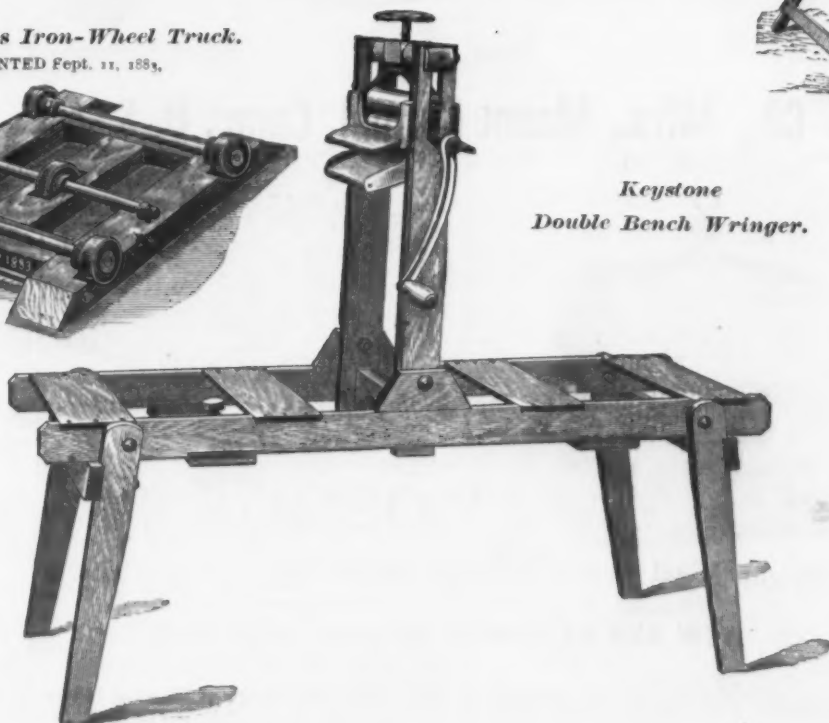
Duplex No. 2 Swing.



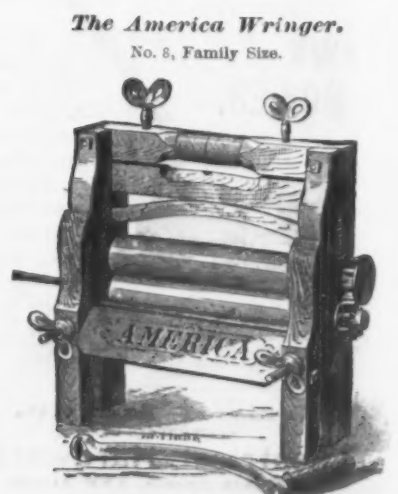
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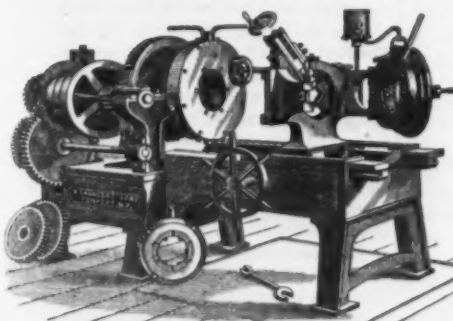
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Naval Officers on Ironclads in the South American War.

The observations of naval officers of this country in the war between Chili and the allied Republics of Peru and Bolivia have been compiled by the Office of Naval Intelligence and are made public. They possess peculiar interest in view of the attention which this Government is now giving to torpedo and naval warfare. In the engagements off the Pacific Coast of South America there were witnessed the actual results that the naval officers of this country have tried to estimate by experiments. Hostilities between the United States and almost any other power would be characterized by features of fighting very similar to those of which this publication of "Information from Abroad—War Series," treats. In the naval battle of Iquique, a Peruvian port, the ironclad turret ram Huascar, under Captain Grau, and the ironclad ram frigate Independencia, under Captain Moore, raised the blockade which the Chileans had established. In the absence of the Chilean ironclads the blockade was being maintained by the wooden sloop-of-war Esmeralda, a predecessor of the since famous Chilean war ship, under Commander Prat, and the gunboat Covadonga, Commander Condell. The small amount of damage done by the firing of heavy guns was a feature of this engagement, and the restraint exercised upon vastly superior force by the fear of torpedoes was another. At 8 a. m. the Huascar fired a shot that struck between the two Chilean vessels, and the action immediately became general, the Huascar singling out the Esmeralda and the Independencia the Covadonga. After the firing had been going on for an hour, at distances varying from 2000 yards to perhaps 1000, the Covadonga steered to the south, the Independencia following her closely.

The Esmeralda remained in Iquique Harbor fighting the Huascar. By this time the Peruvian soldiers had dragged a field battery to the beach and opened fire at distances not exceeding 400 or 500 yards. Thus, with the 300-pounders of the Huascar on one side and a field battery on the other, the Esmeralda was forced to abandon her position near the shore, which she had taken to avoid a ram attack from the enemy, and go further out in the bay. The time when this occurred and that at which the Huascar first rammed has not been fixed satisfactorily, but it could not have been far from 10.30, two hours and a half after the beginning of the fight. It appears that Captain Grau was deterred from ramming by the fear of torpedoes, which he supposed were placed around the Esmeralda, and he rammed only when the latter vessel was driven from the place which she had first occupied by the fire of the field battery on shore. The defense of the Chilean vessel would have lasted a much longer time if the fight had been decided entirely by the guns. The Huascar kept up a fire from all her guns for four hours, and during this time must have fired at least 40 shots from her two 300-pounders; yet it is recorded that only one of those shots struck the enemy. This shot passed through the side, burst into the engine-room and killed every one of the engineers, besides disabling the engine. The reply of the Esmeralda was most effective, as is testified by Captain Grau; but musketry and 40-pound shot are no match for 7-inch armor. When the Esmeralda came out in the bay Captain Grau determined to ram her. In the first attempt the Huascar, steaming about 8 knots and steering northeast, struck the Esmeralda, nearly motionless and heading north, on the port quarter. The Huascar's engine was stopped when she was about one ship's length from her adversary. The blow was harmless. Captain Prat, followed by one man only, gallantly sprang on the fore-castle, and, sword in hand, rushed aft on the port side of the deck, and was killed by a musket-ball at the foot of the turret. The command now devolved upon Lieutenant Serrano. The Huascar backed off and made at the Esmeralda again, this time heading south. The Chilean vessel presented her bow. The Huascar's engines were stopped too soon, and she struck the starboard bow of the enemy, doing little or no damage. Again a boarding-party, headed by the commanding officer, Lieutenant Serrano, leaped on the Huascar's deck, but only to be shot down. The third attempt to ram was successful. Captain Grau, going at full speed, stopped his engines when 20 feet from the Esmeralda, and struck squarely on the starboard beam. The Esmeralda sunk with colors flying and guns firing. Meantime the huge Independencia had followed the little Covadonga along the coast, making three attempts to ram, but failing every time and finally running upon a rock and sticking fast. In this situation the little craft forced the Peruvian to surrender, but before possession could be taken the Huascar, having finished the Esmeralda, came to her consort's rescue and ran the Covadonga off.

Here was a nominal victory for two ironclads equipped with heavy guns against two small wooden vessels. Commenting on the battle, the United States officer says: "When the ramming began, Pratt called away his boarders, and, as already stated, actually succeeded, with one sergeant of marines, in reaching the enemy's deck. Had the contact been of longer duration he would have succeeded probably in transferring his crew to the decks of the Huascar, with a very fair chance, according to Captain Grau himself, of capturing the vessel, as the crew was, with very few exceptions, very much demoralized. Serrano's attempt failed from the same cause. When the Huascar finally did succeed in sinking the Esmeralda, which was then little more than a stationary target, she injured her own bow so severely that extensive repairs were necessary. The musketry fire of the Esmeralda was so well sustained that it was thought that she was provided with machine-guns. Condell could not have done better with his little ship. That he followed the correct tactics in keeping close to the shore was proved by the results. His artillery fire, which was continued throughout the chase, was so excellent that he dismounted the heavy bow pivot of the Independencia before it had succeeded in sending more than one shot into him. What the effect would

have been if this had not occurred may be imagined from the fact that this shot entered the starboard quarter, raked the whole length of the ship, and passed out on the port bow. The other two guns, being protected by iron plating, continued to fire with but moderate results, owing to the want of training of the guns' crews. The small-arm fire of the Covadonga kept the enemy's crew below, and killed the three helmsmen at the critical moment, according to Captain Moore, who, like Captain Grau, mistook it for machine-gun fire."

A month after the above the crack war-ship of the Peruvians engaged one of the Chilean ironclads, the Magellanes, again illustrating the uncertainty of this ponderous style of warfare. The Huascar headed toward her, and at a distance of 300 yards fired a 300-pounder, at the same time opening a heavy fire of small arms and machine-guns. The Magellanes returned a stand of grape from her 64-pounder, and commenced a well sustained fusillade, it being impossible to fire again with the great guns, as they could not be brought to bear. The Huascar made two attempts to ram that were evaded by her lively antagonist. She then took her station at a distance of 100 yards from the starboard side of the latter and continued firing. This maneuver brought her within range of the 115-pounder of the Magellanes, one shot from which was fired, but without serious effect, although Commander Latorre claims to have pierced the ironclad at the water line. The Huascar turned and made another ram attack, coming perpendicularly to the enemy and aiming amidships. By a dash ahead this was avoided. A fourth attempt was made to ram, bow to bow, but with no better success. The Huascar had now fired six 300-pounder projectiles, the Magellanes one 115-pounder, one 64-pounder stand of grape, six 20 pounder shell, one 20-pounder grape, 2400 small-arm cartridges and 360 Adams revolver cartridges, and, with the exception of a considerable cutting up of the rigging, boats, &c., and three men slightly wounded, the results were nil. Another Chilean ironclad coming up, the Peruvian withdrew.

The boomerang character of the torpedo was illustrated in the Bolivian harbor of Antofagasta, which the Chileans had occupied. The Huascar, having taken on board two Lay torpedoes and an operator, ran into Antofagasta and approached the Chilean ship Abtao, which lay at anchor off the reef, to a distance of 200 yards. This distance had been selected by the expert, although the admiral had offered to place his vessel nearer. One of the torpedoes was then launched from the deck and had proceeded some distance on its course when it began to turn to port, making a half-circle in that direction, and coming back toward the vessel. Efforts were made to stop it, but nothing but a reduction of speed was effected. Lieut. Diez Canseco, appreciating the danger to which all were exposed, jumped overboard and caused the torpedo to deviate from its dangerous course. This trial thoroughly disgusted Grau with this system of torpedoes, and on his return to Iquique he had them landed and buried in the cemetery, where they were resurrected by the Chileans some months afterward. The next day at 11 a. m. the Huascar again ran in and engaged the shore batteries and corvettes Magellanes and Abtao, severely damaging the latter vessel, besides killing and wounding about twenty of her crew. The Huascar was struck by a 150-pounder shell that entered her smoke-stack on the starboard side, and, descending, passed out through the smoke-stack and coming of the fire-room hatch, about 15 inches from the deck on the other side, killing the lieutenant commanding the quarter-deck division of guns, who happened to be behind the smoke-stack at the time, wounding the ship's bugler, and, glancing on the water-way, passed overboard without exploding. Had this shot been a little lower it would have passed through the base of the stack, thence under the armored deck into the port boilers, there being no bomb proof grating to stop it. A 300-pounder common shell, English service percussion fuse, struck the Abtao just at the end of its range of 3000 yards. The Abtao was at anchor, without steam, and at the time heeled toward the Huascar. This shell came in on the starboard side, traversed the iron mainmast, struck the deck on the port side abreast the engine-room hatch, and exploded, damaging the mainmast and bulwarks, tearing a hole in the composite deck about 4 x 6 feet, twisting the iron deck-beams, pieces of the shell breaking up the engine-room gallery plating and passing into the coal-bunkers, the coal in which saved the bottom of the ship. The chief engineer, who was on the spar-deck, and five men were killed. One of the latter had his head taken entirely off by the barrel of his own rifle, which he had slung across his back diagonally, a piece striking the muzzle, which projected above his right shoulder, his back being toward the enemy. Another similar projectile, fired in the same round a minute afterward, glanced on the bridge-rail very close to the commanding officer, passed through the bridge frame and ladder, went through the smoke-stack, struck a cavi-plate in the port water-way and exploded, bulging out the side and damaging the bulwarks and deck. This shot killed eight men. Both of these fires were remarkable for range and accuracy and for perfect action of the fuses used.

After this the Huascar steamed away south, destroying Chilean vessels. In October, after six months' success on the sea, the allied Republics sustained a severe check in the loss of the Huascar. Their great war vessel, having just escaped an engagement with a portion of the Chilean fleet, gave battle to the armored sea-going rams Cochran and the Blanco. The firing—most of it at close quarters—lasted only about an hour. Ramming was tried on both sides, but without avail. The Peruvian officers attempted to sink their ship by opening valves when they found the case was hopeless, but the Chileans boarded too quickly. The observant officers from the United States Navy were able to draw some important deductions from this battle. It is significant that the greatest execution was done with shells and small arms. The scene on the Huascar, when boarded, was terrible. There was hardly a square yard of her upper works that did not bear marks of having been

struck with some species of projectile. Her smoke-stack and conning-tower were nearly destroyed, her boats gone, and davits either entirely carried away or bent out of all shape. Her mast was riddled and port chain-plates carried away, but, strange to say, no rigging was cut. The bulwarks, poop, fore-castle and hatch-combings were much injured. The capstan was surrunk and knocked overboard by a shot. The Chilean fire must have been extremely accurate, a fact which is not surprising, as the Huascar was reduced during the latter part of the fight—in fact, from the time the Cochran took up her position on her quarter—to little more than an armored target. Below the scene was much more terrible. Everywhere was death and destruction caused by the enemy's large shells. Eighteen bodies were taken out of the cabin, and the turret was full of remains of the two sets of guns' crews. The light work-wood, ladders and bulkheads were all destroyed. It was claimed that many valuable documents were captured. Among the papers found were complete working drawings of the Blanco and Cochran, the attacking vessels. The ship's log and steam log had disappeared; it is claimed that they were burned in the furnace, with many other documents. The total duration of the action was 90 minutes. During this time the Huascar lost or had disabled her commander and the three next senior officers, besides 28 officers and men killed and 45 wounded out of a crew of about 200. She had her steering-gear disabled three distinct times by the enemy's fire, was set on fire in eight different places, had her turret jammed, her right turret gun disabled and her light guns and Gatling unmanned.

A more curious and demoralizing shot effect can hardly be imagined. Nearly every time that she was struck the greatest possible temporary damage was inflicted, and yet no permanent injury was caused. The armor in this case was only a great disadvantage to her. It served to explode the enemy's projectiles, which in no case stopped when they struck at any but the smallest angles. The backing and inner skin only served to increase the number of fragments which were driven into the interior of the vessel with deadly effect. On the contrary, the shell that passed through the light iron sides of the fore-castle did not explode and did but little damage. The explosion of each shell—and each shell which pierced her armor exploded—set the ship on fire in a new place. This would suggest the great necessity of permanent water mains with short hose connections in all parts of a vessel. The Chilean small-arm and Nordenfolt gun fire drove every one from the decks and away from the unprotected quarter-deck guns, showing what an important factor that class of fire is to play in all future naval actions. The Chileans had 12 of their best marksmen stationed in each of their fore and main tops. This fire would have been much more terrible had repeating-rifles been used. The fact that good marksmen with rifles drove the crew away from a machine-gun should not be lost sight of. The Nordenfolt, also adopted in the English service, is similar in effects to the Hotchkiss revolving cannon. It has proved itself not only effective against the personnel, but also against the materiel. This class of arm is certainly of great importance. The mere fact of even the smaller calibers being able to penetrate the sides of any of our unarmored vessels up to 800 m. (70 projectiles a minute) ought to call our attention to it very seriously. The difficulty of ramming when both vessels are under way, even when one is almost unmaneuverable, is a feature worthy of notice.

It has been asked, Of what use would the Whitehead system of torpedoes have been in such an action? The answer would seem to be that the Whitehead or any of the diverging systems would have proved to be dangerous and suicidal. The spar type alone might have been used. The great necessity of having several different means of steering seems also to be well proved, especially some of the systems proposed for steering along the keel, or perhaps even a second rudder, as fitted to the new "C" class of English corvettes. The places where each of these systems are worked should be in direct telegraphic or voice-tube connection with the position or positions selected for the commanding officer. The position of the commanding officer in action seems another matter worthy of consideration. Near the base of the smoke-stack, the best vertical target on a vessel, seems to be the worst place. The Huascar's tower had another disadvantage; it was between the smoke-stack and the turret, the next best target. In this way it stood an excellent chance of being hit by the projectile which missed either of these prominent objects. The top of the turret was found to be the best position for us, but a second should certainly be provided. A splinter grating over the engines would seem to be suggested by the mass of debris which fell on them, but, almost miraculously, did not stop them. It is worthy of note that, while the Chilean vessels could always bring some of their guns to bear on the Huascar, the Huascar found herself in many positions where only steering would bring her guns to bear on them. In fact, this action tends to prove that on all round fire even inferior or single guns will have a great advantage over a preponderance of fire within only given limits.

It is also worthy of note that within two months after this, known as the battle of Mejillones, the Huascar was repaired and doing service in the Chilean fleet. Mastery of the sea was lost to the allied forces by this result, and thenceforward the engagements were for the most part half sea and half land battles. These took place at the Peruvian ports.

Orders were issued from sanitary headquarters in this city, on the 7th inst., to the saloon-keepers, directing that the use of metal faucets for drawing beer be discontinued, and that wooden or brass taps, lined with glass or block tin, must hereafter be substituted. As there are some 10,000 saloons on Manhattan Island, if all these comply with the order there will be a decided revival in the brass-taps industry, with a corresponding depression in the market for metal faucets.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, October 15, 1885.

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The Chanoine Dam on the Ohio at
Pittsburgh.

The formal opening on the 7th inst. of the Chanoine dam at Davis Island, on the Ohio River, 5 miles below Pittsburgh, was made the occasion of a most interesting and striking celebration. The scene must have recalled the bustle and activity that characterized its wharfs and river in the days before the traffic that poured through what Washington called "the gateway of the West" was monopolized by the railroads, and seems to have led the most sanguine to fondly predict the return of the days of river transportation. To these prophets this Davis Island dam is the first of a series of river improvements that is to make the Ohio navigable the year round, except when frozen over. While it is not impossible that in the course of many years such a series of improvements may be carried out, it is not at all probable. In the first place, if the cost of this dam is to be taken as a criterion, the locks and dams necessary to make a navigable stage of water in the Ohio would entail an expenditure of many millions without a gain at all commensurate with such expenditure. In the second place, if such a series of improvements were to be completed, we question if the traffic would justify their retention and care. In past years, when the cost of railroad transportation was very much in excess of what it is now, inland water transportation by river or canal was necessary for the moving of bulky products. The difference in the cost of such water transportation and that by railroads was so great as to compensate for the delays and risks incidental to the cheaper and slower method, but with the present channels of communication between the East and the West, and between those sections of the country that would be benefited by the improve-

ment of the Ohio River, the river could only compete with the rail in exceptional instances. River transportation is doubtless necessary if the coal of the Monongahela Valley is to be carried to the lower markets—and the vast majority in bulk of the tonnage that would go down the Ohio River would be coal—but the expenditure necessary to improve the Ohio River would not be justified for the coal traffic.

To the hydraulic engineer, however, this dam on the Ohio is an interesting work. It is built on what is known as the Chanoine or wicket system, and is so arranged that at times of low water the wickets can be raised so as to give 12 feet of water at the dam and 6 feet at Pittsburgh, 5 miles above. At such times boats can pass through the lock, which is some 600 x 110 feet. In times of high water or flood the wickets are lowered to the bed of the river, and the large fleets of boats loaded with coal which form such a feature of transportation on the Ohio River can pass over the dam without passing through the locks. Such dams are by no means uncommon, though this is the first one erected near Pittsburgh. A number of them are in operation in the rivers of France, but none of these approach the one at Pittsburgh in magnitude, and the size of the navigable pass in this dam is only made possible by an improvement in the hutter or the cast-iron block supporting the foot of the wicket.

To Pittsburgh this dam is of great importance. Many of the iron works of that city are situated on the banks of the three rivers, the Allegheny, Monongahela and Ohio. The interchange of products between these mills and the foundries and machine shops in the city, and the delivery of freight to and from the railroads, has occasioned a great deal of expensive and roundabout hauling, made necessary by the river barriers between the points of departure and delivery. It has not been possible to arrange for a regular system of barge transportation, owing to the frequent lack of a navigable stage of water. This dam promises a 6-foot stage constantly at Pittsburgh, and it is the intention of parties in that city to establish a barge delivery, which, in the case of heavy materials, cannot fail to be of great advantage to the city. In another column we give a description of the main features of the dam.

British Capital in American Iron Enterprises.

English capitalists appear to be showing a growing fondness for investments in American iron manufacturing enterprises. Until now their ventures have not been accompanied by such phenomenal success as to warrant a rush into the business. The Ferrie Furnace at New Glasgow, in fact, was one of the most pronounced and conspicuous failures in the history of the American iron trade. More recently there has been grief among the English holders of stock and bonds in the Colorado Coal and Iron Co., and the shareholders of the Iron and Steel Works Association of Virginia, Limited, who built the Victoria Furnace, have not to our knowledge received any returns. In spite of the record, of which those named are examples, a large amount of money has been put into the plant of the Dayton Coal and Iron Co., in Tennessee, and only recently another furnace enterprise in the South was floated in England. The latest addition to the list is, however, a concern organized in Glasgow, to take up one of the old iron properties of the New England car-wheel iron district. A brief note in the last issue of the *London Ironmonger* says:

Mr. R. R. Tatlock (of Wallace, Tatlock & Clark) has recently returned to England from a visit to America after personal examination of the iron deposits in Western Massachusetts. His statements of the character of the country, the quantity of ore, and its adaptation to the purposes of cast-iron car-wheels, for which it is utilized, are most glowing. The industry of making the only car-wheels that are used under American railway carriages appears, from the statements of Mr. Tatlock, to be one of the most certain and unfailing in that country. The property which he examined, together with the neighboring property at Salisbury, Conn., holds a practical monopoly of the first-grade car-wheel iron. This property has recently been acquired by a Glasgow company, of which Viscount Bury, the Under Secretary for War, and Mr. James Field Stewart are the trustees. The Board of Directors is composed of Messrs. Alexander Smith, Edgerton Engine Works, Chairman; William Beardmore, Parkhead Forge; Neil Robson, Northern Hematite Co., Limited; William D. Gilles, iron merchant, Glasgow, and director of the Burntisland Oil Co., Limited. To this are added the names of Mr. Stephen H. Tyng, London, and the Hon. J. L. Colby, Massachusetts, U. S. It is the intention of the board to issue 1000 7 per cent. first-mortgage bonds of £100 each, secured by deed of trust upon the property of the company, for the purpose of completing the purchase and extending the works connected with this undertaking. The debentures are said to have been underwritten and will be privately placed.

In the absence of a full copy of the report by Mr. R. R. Tatlock, to which reference is made, it is, of course, impossible to judge whether the statements attributed to it are not in reality so qualified as to come within the bounds of the truth. Those acquainted with the iron industry of that section of our country will promptly protest against any such a claim that the Lanesborough furnace, which is probably the property referred to, and the Barnum-Richardson interest, presumably "the neighboring property," hold a practical monopoly of the first-grade car-wheel iron. There are a number of other producers whose existence the Scotch capitalists would promptly recognize when they reached the markets. The experience of makers of car-wheel pig during the past four years does not, either, bear out the

broad assertion that it is "one of the most certain and unfailing in this country." It is not so regarded by those who must depend upon the demand in the open market to place their products.

We repeat that it is necessary to suspend judgment as to the merits of the scheme brought before Scotch capitalists, in the absence of knowledge of the full contents of the reports in question. The printed references to it have a rose color which does not augur well for the ultimate outcome of the enterprise. It may be said that it is a matter of indifference to the American iron trade whether or not a few rich foreigners make or lose money by going into the business in this country. We do not hold that view. Unsuccessful concerns, whether they are backed by American or by foreign capital, are always an element of weakness and of disturbance to the trade at large and to the nearest competitors. The possibility of any addition to their numbers must give rise to well-founded fears. We do not wish to be understood as holding the opinion that the latest enterprises taken up by British capital come under this class. But it does seem that the investment has been encouraged by reports which have a sanguine flavor about them. Then it must not be forgotten that the history of English iron enterprises in this country has been one characterized by so many failures that other grounds than the lack of merit of the undertaking itself must be looked for. Their management has been usually entrusted to men whose experience, if they happened to have any, was acquired under conditions differing widely from those shaping business here. Generally, too, any questions of importance are ultimately decided by a board of directors in Great Britain, who cannot and do not follow developments closely, and rarely do the right thing at the right time.

The Flood Rock Explosion.

So far as can be judged now from the character of the explosion witnessed last Saturday by a large number of gentlemen high in professional standing, the blowing up of Flood Rock was a success. Only the future dredging operations can determine whether the conservative and safe course followed by General Newton and his associates will lead to somewhat greater expense than would have been incurred if they had not been so anxious to avoid the possibility of accident. All the manifestations indicate that a somewhat heavier charge might have been safely given, but no one will reproach the engineers in charge for not having done so. They were forced to deal with a greater mass of high explosive than had ever been simultaneously fired before. Practically the engineers in charge were the only ones who had dealt with the nearest approach to such quantities before. Everything that human ingenuity could devise and the most scrupulous care could do to reduce the chances of failure or disaster to a minimum was done, and the issue proved that it was not done in vain.

The removal of Flood Rock is one of a series of operations to obtain a clear channel for ocean steamers through the East River and Sound. The work already done on the Hell Gate obstructions is the deepening of the channel by submarine blasting, above the Diamond Reef, from 17½ to 26 feet of water; above the Coontis Reef, from 14 3/4 to 26 feet; above the Frying Pan and Heel Tap, which were at one time within 11 feet of the low-water line, to 18 feet. Hallett's Reef was blown up in 1876, in a manner similar to that adopted at Flood Rock. The principle adopted is to undermine the reefs by a series of drifts running at right angles, leaving pillars which sustain the roof during the operations. By firing shots drilled into these pillars and in the roof the latter is so shattered that it can be easily removed by dredging operations. The idea has largely gained ground that the explosion must cause the submergence of that part of the reef and the bulkheads hitherto above water, and that, since it did not take place, the operation has been a failure, at least partly. When it is remembered, however, that in that part of the reef the roof remained 40 feet thick, it will be readily understood that with excavations not more than 70 to 12 feet high the loosened mass of rock would easily compensate for the volume of excavation. About 80,000 cubic feet of rock were taken out, while pillars and roof measure about 275,000 cubic yards.

The area of that part of Flood Rock which has been undermined, inside of the 26-foot contour line, was about 9 acres. In this an aggregate of 21,670 lineal feet of galleries were driven, leaving 467 pillars. Into these and into the roof no less than 13,286 holes were drilled, whose aggregate length was about 22 miles. These were charged with a total charge of about 285,000 pounds of explosive, about 6000 pounds being dynamite for the 600 charges fired by ignition, and the bulk of the balance rack-rock, exploded by concussion. These figures will convey some idea of the magnitude of the operation.

The successful termination of the only part of the work on which doubts could possibly have been raised is a matter of gratulation to American engineering enterprise, represented by General Newton and Lieutenant Derby. It will take some time before vessels will sail over the spot where once an ugly-looking rock projected from the water, and considerable work is still to be done on other obstructions in the same quarter; but

the greatest blast which was absolutely necessary to clear the channel has been fired, and it will be only a comparatively short time before Transatlantic steamers may elect to sail from this port through the Sound. It is not believed that even then they will believe it to be good policy to try to avoid Sandy Hook when coming in. To the commerce of the city and of the country the early completion of the work is a matter of great importance.

Manufacturing Operations by Railroads.

Quite recently the question has again come up for discussion whether it does or does not pay railroads to manufacture their supplies themselves or to buy them in the open market, or contract for them from private makers. The tendency toward the aggregation of different lines into great systems controlling thousands of miles of road naturally causes this subject to acquire greater interest, since it is with large organizations particularly that the temptation to save manufacturers' profits is greatest. The step from the making of repairs to the production of entirely new equipment and rolling stock is an easy one, and there are many reasons to encourage the management to take it. It may aid in filling gaps of idleness for a force of men and an extensive plant of machinery. It is generally strongly urged by those in charge of the ordinary repair operations of the concern, because it increases their responsibilities and their power. Sometimes, too, collateral industries are grafted upon the parent organization, with the object of turning special profits into the pockets of a favored few. There are a number of instances on record in which coal-mining operations have been carried on practically by the directors of a company to supply railroads at the sellers' price. There is at least one of the iron mills in the country which occupied a similar position until a quarrel landed the smaller interest into penurious independence. Aside from such organizations, apparently distinct concerns, but in reality started to "milk" a railroad, there are a good many shops and manufacturing establishments of no mean importance run directly by railroads and for them alone, on their merits as a part of the general organization.

There can be little doubt that there are circumstances under which railroads will and do find it very profitable to engage in manufacturing. This is most likely to occur in localities distant from centers of industry. But, on the whole, the necessity is not very frequently felt. There are many good reasons, on the other hand, why it is not conducive to true economy to add the work of the producer to that of the carrier. The principal one is that it renders the organization of the railroad more diversified, more extensive, and therefore more difficult to handle. Since they are not trained to it and are not experienced in it, the railroad managers must delegate the responsibility and the direction of the work to subordinates, whose operations, deprived of the constant and vigilant care like that of the owners of private establishments, naturally do not come up to the highest standard of efficiency. Supplies are not bought so advantageously; costs are not so closely followed and so accurately determined; the grade of work is not so keenly maintained, and thus the profits of the manufacturer, which it was the object to save, dwindle down to nothing. In the relations between the manufacturing department of the railroad and the officers who receive the product that beneficent attitude of hostility between buyer and seller is lost. Demands are less heeded and the stimulus of rivalry between competitors does not push the maker to meet or even anticipate the requirements of the user. In the absence of an active interchange of ideas with many purchasers holding different views, there is a tendency to fall into certain grooves. The red-tape of a great organization is apt to stifle the progressive spirit in what is, after all, a minor department in it. The incentives which constantly urge a private concern to do the best work at a minimum cost are largely lost under such circumstances. We do not deny that there are cases on record where the exceptional qualifications of individual officers have made model institutions of some railway shops, but they are exceptions and rarely outlast the tenure of office of the one person to whom the success was due.

There is one fact upon which there is a good deal of misapprehension on the part of ambitious railroad managers. They have an exaggerated idea of manufacturers' profits. Taking reasonably long periods, covering times of great activity and of depression, their returns are not much, if any, greater than those on the actual cost of railroads. The latter, if they do possess available funds, could probably in the majority of cases find more profitable employment for them in improvement of property and of service, or in extensions into new territory. Considering this in connection with the points operating against cheap production under comparatively uninterested management, we believe that railroad men will be wise when they leave manufacturing to manufacturers and confine themselves to the operating of railroads.

At a recent meeting of the British Association the subject of sliding scales for regulating wages in the coal industry was brought before the Economical Section. The gentle-

man who introduced the subject is reported to have stated, to the surprise of his hearers, that the principle of the sliding scale is that the miner and colliery owner were engaged in a common enterprise, and that what was produced was to be shared between them. It certainly is a wonder that the bones of the originators and adherents of the Manchester school of political economy do not start from their innumerable graves all over England in pious horror at such a contravention of its fundamental principle—that wages are paid out of capital. The wage-fund theory has received many shocks, but we know of none more colossal in its bearing than for a professor to announce to a meeting of the British Association that the true wage question was a question of distribution of product, or that there was any wage fund independent of the industrial quality of the laborer. It is to the credit of American laborers that more than 20 years ago, by intuition that seems more than natural, they recognized the truth of the principle that capital does not pay wages, but that they are paid out of product, and demanded and secured the establishment of sliding scales—one in 1864 in the nail works of New England, and another in 1865 in the boiling department of the Pittsburgh mills.

Liabilities of Employers.

Recent decisions in the courts bearing on the relation of employer and employee seem to indicate a strong and decided tendency to change, or at least to modify, certain well-known principles of law supposed to be firmly established. This is more than a tendency in some States, as statutes have been enacted which materially increase and widen the duties and the liabilities of the employing class. Even aside from legislative action, the decision of the Supreme Court of the United States in the late case of the Chicago and Milwaukee Railroad against Ross, which has attracted much attention and elicited considerable criticism both from the legal profession and the public press, is a startling innovation on the common-law doctrine of a master's responsibility, and has done much to excite public interest in this question.

This common-law doctrine or principle which is now so universally questioned may be stated as follows: An employer is not liable to any of his workmen or employees who are injured in any way by the act or the negligence of any other employee, although the act causing the injury was done in the course of the business and common employment. The rule is often stated in another form, viz.: that a master is not liable to a servant for the acts or omissions of a fellow-servant. The effect of this rule of law is to leave the employee practically without any remedy or compensation for the injury done him without his fault while he was engaged in his employer's business and acting under his directions. He can, of course, sue his fellow-employee who caused the injury, but, as in the great majority of cases the latter is not a person able to respond in damages, this right is of little value. Any other person who is thus injured, however, may sue and recover from the employer, as an employer is liable for the acts of his men to every one except a fellow-servant. For example, a passenger who is injured by the collision of two trains caused by the negligence of the engineer of one train can recover from the company. The engineer of the other train, without fault, no matter how seriously he may be hurt, cannot. A mechanic who has charge of the machinery in a factory is careless, neglecting some important duty or precaution. A stranger is injured and also a workman. The former can sue the employer of the mechanic, the workman has no claim. It will be seen that the law as thus stated bears heavily upon the laborer, and oftentimes works great injustice. Yet from 1837, in which year the question seems to have arisen for the first time in this country, until quite recently, there has been a long series of decisions uniformly affirming this principle. The first leading case came up in the Massachusetts courts, and the then Chief-Justice (Shaw) wrote an extremely able opinion in favor of the master's exemption from liability, basing his reasoning for the most part on several prior English adjudications. This made a precedent which, as we have just said, was followed by the courts of other States.

The theory on which the master is excused from liability to his servants or employees is certainly ingenious, however fallacious. The servant is regarded as assuming the risk of injury from the acts of his fellow-servants as part of the contract of service, and, theoretically, he is compensated for this in his wages. This is implied from the contract alone by act of the law. As a matter of fact, it is doubtful whether this subject ever enters into the mind of an employer when he engages an employee to work for him, or of the employee when he agrees to do the service. There is no difference made in the wages of the latter on this account. Nor does there seem to be any valid reason for the law to step in arbitrarily and make this exception in the employer's favor. In every other case but this a master is liable for his servant's acts, and, indeed, he is liable even to a servant, provided he has forced the latter to work with another servant whom he knows to be negligent or incompetent. Still, all that a master is bound to do is to exercise reasonable care in selecting his workman. If one whom he selects is, in fact,

negligent and causes injury to a fellow-workman, the master is not liable unless lack of proper care is expressly proved. But the employer is liable to his men for his own acts or negligence. He is bound to provide safe and proper machinery, tools, work-rooms, and to see to it that his men are exposed to no danger or risk which can reasonably be prevented. Now, if he delegates the care of his machinery, &c., to certain of his subordinates who represent him, why should he not be held liable to the same degree as if he had personally superintended the work himself? Why should he be allowed to protect himself on the plea that his employees, of whatever grade, are all fellow-servants, even those who have direction or control of the others? All that an employer need to do under a strict application of this rule would be to delegate his authority, and his liability is at an end, which is certainly an anomaly in law and morals as well. With the foundation and growth of corporations and railroad companies in particular, employing large numbers of men and acting entirely through their paid officers, who are nothing more than the employees of the companies of a higher grade, it was seen that, were this rule to operate strictly, the companies would never be liable to their servants at all. In consequence, the superintendents and high officials were not deemed by the courts as fellow-servants of the workman, and the acts of such superintendents came to be regarded as the acts of the companies. But this limitation was confined to the general superintendents, not to subordinates who might exercise a certain degree of control, and, as the negligence of those latter persons was in almost every case the immediate cause of the injury, the employee was as far as ever from any redress for his wrongs.

It is to correct this error or injustice that the recent movement to extend the employer's liability has taken place. The case of the Chicago and Milwaukee Railroad against Ross, referred to above, was a long step in this direction. It was there held that a train conductor in charge of the train, with a right to command its movements and control the persons employed upon it, represents the company and makes them responsible to train servants and employees for injuries received by them in consequence of neglect of duty by such conductors. The conductor was held not to be a fellow servant of the engineer, and the latter was allowed to recover damages from the company. The first agitation of this subject occurred in England, and the select committee of the House of Commons to whom the matter was referred, in their report of 1877, say: "Your committee are of opinion that in cases such as this—that is, when the actual employers cannot personally discharge the duties of masters, or where they deliberately abdicate their functions and delegate them to agents—the acts or defaults of the agents who thus discharge the duties and fulfill the functions of masters should be considered as the personal acts or defaults of the principals and employers, and should impose on such the same responsibility they would have been subject to had they been acting personally in the conduct of their business, notwithstanding that such agents are technically in the employment of the principals. The fact of such a delegation of authority would have to be established in each case, but this would not be a matter of difficulty. Your committee are further of opinion that the doctrine of common employment has been carried too far when workmen employed by a contractor and workmen employed by a person or company who has employed such contractor are considered as being in the same common employment."

Following the suggestions of this committee, there was enacted in 1880—the Employer's Liability act—which, so far as this special subject is concerned, is quoted here: "Where personal injury is caused to a workman (1) by reason of any defect in the conditions of the ways, works, machinery or plant connected with or used in the business of the employer; or (2) by reason of the negligence of any person in the service of the employer who has any superintendence intrusted to him while in the exercise of such superintendence; or (3) by reason of the negligence of any person in the service of the employer to whose orders or direction the workman at the time of the injury was bound to conform and did conform, where such injury resulted from his being so conformed; (4) by reason of the act or omission of any person in the service of the employer, done or made in obedience to the rules or by-laws of the employer or in obedience to particular instructions given by any person delegated with the authority of the employer in that behalf; or (5) by reason of the negligence of any person in the service of the employer who has the charge or control of any signal, points, locomotive engine or train upon a railway—the workman, or, in case the injury results in death, the legal representatives of the workman, and any person entitled in case of death, shall have the same right of compensation and remedies against the employer as if the workman had not been a workman of nor in the service of the employer engaged in this work."

Georgia, Iowa, Kansas, Mississippi, Rhode Island, Wisconsin, Montana and Wyoming have adopted the English policy, and changed the law accordingly. In 1883 the Railroad Commission of New York submitted the draft of a bill embodying these principles, but it was not acted upon,

the Legislature being disinclined to show apparent hostility to the railroad companies, who, owing to the large number of their employees and the frequency of accidents, would be most seriously affected by the passage of such a measure. Of course all employers are to some degree affected, and are perhaps naturally opposed to such legislation, but it is extremely probable that the change will before long be made.

The building trade is one of those in which the power of workmen's unions has far overstepped the bounds within which it is legitimate and beneficial, and in which it has been carried to the point of downright tyranny. One of the measures taken by trade unions to "protect" themselves is to limit the number of young persons who are allowed to learn the trade. With the laudable object of affording deserving young men the opportunity to acquire a preliminary training in handicraft, trade schools have been established. Against these the wrath of the officers of the building trade unions are beginning to be directed. One of the "walking delegates" in this city is credited with the assertion that a stop is to be put to this system, because it is claimed by them it injures good tradesmen to have young men employed at apprentices' wages when they have only a smattering of their trade. Nothing, we believe, could be a better proof of the good work which the trade schools are doing than to acknowledge that those coming from them are dangerous competitors. No one will claim that a young man after a course in them is qualified to do the work of men who have many years of experience and skill. The trade schools, no more than any other institution in which beginners are taught, can supply that, but they are expected to, and evidently do, facilitate the work of acquiring them. The members of unions are not entitled to a monopoly of skill and experience, and any attempt on their part to enforce any such claims will simply be disastrous, ultimately to those who advance them. If they were clear-sighted enough to know their best interests, the members of unions would encourage trade schools or would themselves start and maintain them. As it is they are placing themselves in antagonism with the rising generation, and are alienating the very best element which enters their business.

A system is coming into vogue to a considerable extent in the coal mines of France, which has only been followed in a few cases in other countries. Coal mining and rock and other dead work, instead of being paid for at the price, as in most mining regions, are let out to the lowest bidder among the men. The successful bidder virtually becomes a contractor, and underlets the work to the less successful bidders, or to those who took no part in the competition. The adjudications are usually made every month. Often, to encourage the men to make as much large coal as possible, prizes are given where the proportion of lump to nut and slack exceeds a certain percentage. It is stated that the results of this method are very satisfactory—we presume, to the mine-owner and the workman who gets the contract. Such competition certainly cannot fail to have a serious and injurious effect upon the wages of workmen in a section and in an industry where the laborers are already insufficiently paid.

Obituary.

PETER TOWNSEND.

By the recent death of Mr. Peter Townsend, at the advanced age of 82, one of the last of the generation which assisted at the birth of the iron industry in this country as we know it has passed away. Descended from ancestors who came from England more than two and a half centuries ago, of a family whose members have always been prominent for enterprise and integrity, Mr. Townsend was a worthy representative of the name and of those who immediately preceded him. Something over 150 years ago the Townsends acquired the Sterling iron property, embracing a tract of about 50,000 acres in Orange and Rockland counties, N. Y., and extending into New Jersey, and on this tract three successive Peter Townsends lived and made iron, he who has just died having been the grandson of the first of that name, who died in 1783; each of them was in his time foremost among the men who established the manufacture of iron in America; the first Peter Townsend produced the first German steel made in the Province, and made, at the Sterling Forges, the great chain which was stretched across the Hudson, just below West Point, in the Revolution, to prevent the British passing up that river. Under him and the second Peter, also at Sterling, were made the first cannon for the use of the infant United States Navy, as well as, in 1753, the first anchors made in this country, and later those used on the famous old frigates Constitution, Constellation and Congress. Under the second Peter was made the first blister steel produced in the country. He and his son Peter were the first to attempt the use of anthracite coal in the blast furnace, mixing it with charcoal which only had until then been used, anthracite having been considered an impracticable fuel. Mr. Townsend, not content with the care of the Sterling property, in the management of which he became associated with his father after serving a banking and business apprenticeship with the old and well-known New York firm of Jacob Barker & Co., became interested in the project of building furnaces and mills at Brady's Bend, Pa., and visited England to examine similar works there and get a knowledge of their best appliances; returning, he super-

intended the construction of the Brady's Bend Works, and with his own hands there drew from the rolls the first rail made in America; but the pecuniary results at those works not equaling his expectations, his connection with them was of short duration. He retired from active business in 1864, but always continued to take an active interest in, and kept himself thoroughly familiar with the latest processes and improvements of, the iron trade. He was a large, powerful man physically, with a strikingly fine, handsome face. He lived, in winter, in Twenty-third street, New York, and was a member of the Union League and Union clubs. His summers were spent mostly at Southfields (a part of the Sterling property), with frequent trips to the Suffolk Club, on Long Island, of which he was a member. He was a communicant of the Rev. John Hall's Presbyterian Church. His character was a singularly strong and independent one, thoroughly manly. Not ostentatiously charitable, his heart and purse were always open to appeals from those who deserved his aid, and he was especially kind to those formerly employed by him, many of whose families had for three generations worked under the Townsends at Sterling. He left no son, but three daughters, who married, respectively, S. L. M. Barlow, Thomas Francis Meagher and David Crawford, Jr.

A. W. H.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 12, 1885.

The Secretary of the Treasury has issued a circular to supervising and local inspectors of steam vessels amending the regulation concerning the ductility of steel boiler-plate. Under the old rule the average ductility was 29 per cent. on a test of 700 boilers. The requirement of 70,000 pounds tensile strength had not only the effect of stopping the manufacture of that class of steel, but it was impossible to get that grade for the repair of boilers. The present circular gives 14 per cent. more ductility than the average under the previous rule. It is also based upon a compromise of the claims of the manufacturers and the requirements of the former rule. The following is the text of the circular:

TREASURY DEPARTMENT,
WASHINGTON, D. C., September 28, 1885.

Supervising and Local Inspectors of Steam Vessels and Others: It having been ascertained to the satisfaction of the department that the regulation promulgated in Department Circular No. 29, February 25, 1885, to take effect September 1, instant, requiring a reduction of area of 53 per cent. on all steel boiler-plates of 65,000 pounds tensile strength and upward, is an actual prohibition of the manufacture of such plates, said regulation is hereby modified so as to require a reduction of area as follows:

Tensile strength.	Reduction of area.
70,000 pounds.....	43 1/2 %
65,000 pounds.....	50 %
60,000 pounds and under.....	55 %

This regulation will remain in force unless otherwise ordered at the close of the next annual meeting of the Board of Supervising Inspectors. DANIEL MANNING, Secretary.

THE ADMINISTRATION AND THE TARIFF.
Much interest is felt in the position the Administration will take on the tariff. The President has called a halt on the bureau officers, who with superserviceable zeal have covered an immense range of subjects in reporting the operations of their respective branches of the administrative departments of the Government. They have been requested to confine their official reports to routine matters in their charge. The President will examine this material after having passed through the hands of his Secretaries, and will formulate his own policy in regard to public affairs and administrative methods. The Cabinet is a unit on all questions but the tariff, and how they will harmonize their conflicting views on that subject remains to be seen. The Secretary of State, Mr. Bayard; the Secretary of the Interior, Mr. Lamar, and the Attorney General, Mr. Garland, are on record in their speeches in the Senate. Their views have always had a decided free-trade leaning, and Mr. Bayard even went further and made a free trade speech at a free-trade meeting during the tariff controversy in Congress pending the Parliamentary tactics growing out of the report of the Morrison horizontal reduction bill. The Postmaster-General, Mr. Vilas, entertains the Western Democratic idea of the tariff. Secretary of War Endicott is New England Democratic in his notions, or tariff for revenue only. This leaves the Secretaries of the Treasury, Mr. Manning, and the Navy, Mr. Whitney, the remaining members of the Administration, to stand up for incidental protection. The President, with these diverse elements in his official household to reconcile, may have a task somewhat more difficult than he now anticipates. Secretary Manning says when the tariff question shall have been reached by the Administration there will be no differences among its members. This points to a compromise policy.

UNDervaluation.

The replies from various sources to the circular of Secretary Manning on undervaluations, false appraisements and other irregular practices by foreign manufacturers are coming in slowly. The tariff inquiry, however, is not faring so well. There is no difference of opinion among manufacturers in opposing a reopening of the question. When Morrison, Mills et al. begin their agitation and introduce their bills there will be a general advance along the line in opposition to their movements.

INDUSTRY IN SOUTH RUSSIA.

The Russian Government, in order to encourage the development in coal mining, reports that the consul at Odessa has levied a duty of 2 copecks in gold per pool, or about \$1 per ton, on imported coal. The consul says Russian coal, especially anthracite, is found in apparently inexhaustible quantities and of excellent quality. It is also coming into general use on railways and in manufacturing establishments in South Russia. In the same report an interesting

account is given of the Russian demand for American agricultural machinery, pumps, scales and sewing machines. The American reapers and mowers, drills, seeders and pulverizing harrows have a large sale.

METALLURGICAL.

The Chemical Reactions of Burnt Iron.

An investigation into the chemical reactions which occur when cast iron is exposed to high temperatures for long periods, becoming what is known as "burnt iron," has been made by Mr. B. Platz, of Duisburg-Hochfeld. He examined a number of articles which had undergone long exposure to high heats, of which the following are examples: 1. The upper part of a coke-oven door showed sound iron at the outside and a burnt-iron core, while the inner surface exposed to the heat directly was covered with a scale which had evidently been fused. The sound iron had the following chemical composition:

1. Sound iron. Per cent.

Iron.....	90.82
Silicon.....	2.57
Manganese.....	0.86
Phosphorus.....	1.71

The burnt iron contained the following constituents, the second column being the elements computed on the percentage of iron in the sound metal.

2. Burnt iron. Per cent.	
Iron.....	81.25
Silicon.....	2.06
Manganese.....	0.77
Phosphorus.....	1.05

The actual and corrected composition of the scale was as follows:

Analysis of Scale. Per cent.	
Iron.....	60.84
Silicon.....	3.88
Manganese.....	0.78
Phosphorus.....	2.81

It will be observed that the burnt iron shows a decrease, and the scale a considerable increase, in the percentage of silicon, manganese and phosphorus. It is probable that the burnt iron did not have a uniform composition, a gradual falling off in the percentage of the substances toward the scale taking place. A second example was that of a massive piece of iron to cm. square. The core was slightly burnt, the parts around it more and more so, the surface being covered with a thin layer of scale. Chemical analysis yielded the following, the figures for the burnt iron and the scale being computed on the basis of the iron contents of the core:

	Core.	Burnt iron.	Scale.
Iron.....	88.16	81.25	60.84
Silicon.....	2.19	2.06	3.88
Phosphorus.....	1.50	1.05	2.81

These figures indicate that the iron had not been exposed to a very high temperature. The liquidation of the silicon and the phosphorus had taken place only to a moderate extent. Another instance is offered by the results of a piece from a pot for annealing malleable iron. The core was burnt dark gray, with fine-grained fracture. It was covered inside and out by a scale. The figures for the composition of the latter are again computed from the direct analysis:

	Burnt core.	Scale.
Iron.....	86.94	60.84
Silicon.....	2.06	3.88
Phosphorus.....	0.98	2.81

In another case an annealing cylinder yielded the following analyses from the sound unaltered iron, the burnt iron and the scale:

	Sound iron.	Burnt iron.	Scale.
Iron.....	91.54	81.25	60.84
Silicon.....	1.54	1.73	3.88
Phosphorus.....	0.65	0.45	0.12
Manganese.....	0.73	0.63	0.79

It will be noted that silicon and phosphorus, or the silicates and phosphates, behave irregularly, so far as their liquidation is concerned. It appears that the silicate of iron is more fusible than the phosphate, but that at a certain temperature the latter becomes more fluid. That this is the case is indicated by the following test: A piece of a heating-pipe showed in its fracture four layers: a, a dull gray layer of burnt iron; b, a thin streak of white, coarsely crystalline iron, which could be easily lifted off with a chisel; c, a dark gray layer, very fine-grained, also consisting of burnt iron, and d, a porous scale. Analysis yielded the following:

	a.	b.	c.	d.
Iron.....	88.31	2.70	1.53	3.41
Silicon.....	0.96	0.98	0.58	1.02
Phosphorus.....	0.68	0.05	0.05	0.05

If it be assumed that the layer a was the one least exposed to the heat, and underwent less change than the others, considerable variation in the silicon contents of the four will be noted, while only the layer c nearest the scale shows an elimination of phosphorus.

Mr. Platz concludes from his researches that the exposure of white or gray cast iron to an oxidizing temperature causes the combustion of silicon and phosphorus long before the oxidation of the iron is completed, and that, furthermore, if the temperature be high enough, the silicates and phosphates of iron formed are liquated out. As the result of them he believes that the best composition for iron for castings exposed for long periods to high temperatures—like the pipes of iron hot-blast stoves—is to keep the manganese and phosphorus low, and to have only enough silicon to aid in the separation of graphite, which is the best protection of iron against oxidation.

The Record of Franklin Furnace.

Messrs. Taws & Hartman, engineers, of Philadelphia, have given to the editor of the Bulletin the following details of the work of one of the Franklin Furnaces, Onida County, N. Y., remodeled recently: The record is for four consecutive weeks in August. Two things are to be noted, viz., the ratio of carbonic acid to carbonic oxide, and the low temperature of the escaping gas. The furnace has carried 3600 pounds of fuel to 7600 pounds of ore, and made No. 1 X pig iron, but it proved too low in silicon. The ore was decreased and the temperature of the blast lowered to give a darker iron better suited to foundry purposes. The run of four weeks referred to is on this decreased burden. The volume of air governs the output of a furnace with a given ore. This volume must have a hearth

proportioned to use it. The size and height of the furnace must be such that the ores will have from 18 to 26 hours' exposure, according to their reducibility. The dimensions of Franklin Furnace are as follows: Hearth, 9 feet; bosh, 14 feet; height, 70 feet; top of bosh from hearth, 21 feet; bell, 6 feet 6 inches; bosh walls, 18 inches, with boiler-plate bosh jacket and no water. The average of the four weeks' run is as follows, gross tons being used:

	Tons.
Anthracite coal, per week.....	2254
Coke, per week.....	3704
Ore, per week.....	1,2294
Limestone, per week.....	3414

Pig iron produced:

No.	Tons.
No. 1.....	2184
No. 2.....	2304
No. 3.....	45
No. 4.....	154

Total pig iron, per week.....	554
Blast, cubic feet of air.....	12,379
Temperature of blast.....	1,084
Temperature of escaping gas.....	170

The total average consumption of anthracite coal and coke per week was 602 tons. The fuel used per ton of pig iron made averaged 2434 pounds for the four weeks. The average yield of the ore used was 45.3 per cent. The cinder made per ton of pig iron averaged 2352 pounds. In making a comparison of furnace-work it is absolutely necessary to have the pounds of cinder to the ton of pig iron. Ratio of carbonic acid to carbonic oxide, 55 to 100 for escaping gas. The temperature of escaping gas is 150° to 180°, but goes up to 200° at noon and midnight, while the fillers are eating. The ores are hematite, averaging 12 per cent. silica. The stock is exposed in the furnace 24 hours. Carrying high heats on the fire-brick stoves, and burdening to suit, the iron has been down to 1.11 silicon. The company use but two stoves, which furnish 1085° readily, the third stove being laid off.

The Inventor of the Hot Blast.

A correspondent of the Engineer claims the invention of the hot blast, generally credited to Mr. James Beaumont, Neilson to have been really made by a Scotch blacksmith, John Buchan. He says: "His hot blast was obtained by placing coils of iron tubing immediately above the heat and flame of his forge and driving the blast from the ordinary bellows through these coils to the fire. He was thus enabled to get a heat in much less time on a larger piece of iron, and more uniformly soft and mellow for welding, than by the common method. In those days this proved to be a desideratum which brought grit to his mill from all parts in repairs to the anchors, &c., of the smacks plying between the ports of Carronshore and London, also in work from the numerous distilleries around, and it was not till after Mr. Neilson had paid a visit to 'Johnnie's shop' that the invention of the hot blast was given to the world."

Plant and Processes.

E. H. Cowles, C. F. Mabery and A. H. Cowles, of Cleveland, Ohio, are the patentees of process for obtaining aluminum from carbon and in a pure metallic state. The ore of aluminum is reduced by an electric current in company with tin, copper, manganese or other metal which will alloy aluminum. The product obtained is an alloy of aluminum with the metal used. The alloying metal is subsequently separated from the aluminum by amalgamation, lixivation or equivalent process, leaving the residue aluminum in the form of an amorphous powder which can be melted down into an ingot. When aluminum is alloyed with either of the metals above named it is said to take up very little, if any, of the carbon, whereas the pure aluminum will absorb a large percentage of carbon.

A new process of casting compound metal ingots has been patented by A. J. Lustig, of St. Louis, Mo. This process is designed to produce an ingot from different metals of different textures, and having different degrees of temper and tenacity. In carrying out the invention, one face of a plate of wrought metal is roughened, so as to leave numerous alternate projections and depressions. The face thus treated is submitted to a borax solution or other flux, and the plate is placed in a mold. Upon the roughened face is then deposited a stratum of melted steel, more or less highly carbonized. The steel seeks the depressions and fuses the projections, to not only make a firm weld, but to produce at the touching surfaces a metal perfectly homogeneous, but differing from that of either stratum. The ingot is allowed to cool in the mold, and when nearly cool the outer face of the steel may be similarly roughened to receive a stratum of a more highly carbonized steel.

A machine for corrugating heavy metal plates and tubes, particularly those which are used for fire boxes, has been patented by G. S. Strong, of Philadelphia, Pa. The machine contains two corrugated rolls, one above the other, of which the upper roll is supported in movable journal-boxes. The work being introduced between the rolls, the lower roll is put in motion. By operating a hand-wheel the rolls are made to gradually approach each other as the operation progresses, so that, when the operation is complete, a series of corrugations will be formed on the work corresponding to those on the rolls. Finally the motion of the rolls is stopped, and the upper roll is raised to release the work. During the entire operation the work is wholly supported by the lower roll, and thus any auxiliary guides and supports are dispensed with.

An apparatus for pouring iron and steel so as to make solid ingots and castings free from blow-holes has been patented by C. A. Caspersen, of Forsbacka, Sweden. The stream of metal, falling into the mold, is divided into a large number of small streams, by which means the gases contained in the metals are enabled to escape. For this purpose the pouring vessel is furnished with fine perforations in the bottom, which, however, must be of sufficient size to not become clogged. A plate with an air-hole is placed upon the mold, and the vessel is placed over an opening in the plate. The molten metal is then allowed to run into the mold.

THE WEEK.

Since flour has become an important article of export, Minneapolis millers have so far strengthened their position that to some extent they establish the price of wheat in this country. An advance by the millers is followed by a corresponding advance in the open market, "limited only by the borders of civilization."

Several American telegraph operators who volunteered for service in Siam were much chagrined to learn on arriving at their destination that the \$120 per month which they had agreed to accept was not sufficient to meet the mere cost of subsistence. The French operators who were to be superseded by "cheap American labor" had been receiving \$200 per month.

Jabez L. M. Curry, of Richmond, Va., who succeeds Mr. Foster as United States minister to Spain, was for two terms a representative of Alabama in Congress. He has been for some years the secretary and active manager of the Board of Trustees of the Peabody fund for encouraging education in the South.

Out of a total area of 36,955,240 acres of land in Florida, only 17,103,182 acres appear on the tax books of the State, less than one-half the area of the State. It is estimated that the lakes, rivers and other bodies of water not assessed cover a total area of 2,241,640 acres, and that there are yet remaining in the southern extremity of the State about 8,000,000 acres that have not been surveyed.

Ferdinand Ward has made a statement purporting to be a complete *exposé* of his business transactions, but it should be taken with some grains of salt, being obviously a presentation of only one side of an account, and glaringly defective in other particulars. It is affirmed of him with apparent truth, since this revelation, that "he began his borrowing of money at exorbitant rates at a time when the firm capital had been wiped out and the firm was actually in debt. He made to his partners no honest statement of their condition. He borrowed money on every kind of collateral he could lay his hands on, no matter whether the securities belonged to him or not. He swindled his partners and outsiders with equal impartiality and coolness, and kindled their hopes of wealth with most gorgeous and deliberate lying. He threw out to such as he thought might be thereby tempted the alluring bait of secret Government contracts which had no existence in fact, and generally comported himself as an accomplished villain."

The merchants and other business men of Cuba are subscribing liberally for torpedoes and war vessels for coast defense.

The Naval Board report that the United States steamer *Mohican*, at Mare Island Navy Yard, is a new vessel, built without authority or legal appropriation, but simply under an order to rebuild and repair, the old hulk meanwhile sinking in the mud. The total cost is \$908,000.

French's Hotel, on Chatham street, in this city, was sold for \$460,000, after standing vacant about four years, pending litigation among the heirs.

A bronze statue of Bacchus, of exquisite workmanship and nearly perfect in every detail, was found in the Tiber while sinking the foundations of a bridge. It is believed to be of the Greco-Roman school of art. The metal has a golden tint.

The exports of alcohol have shown a steady increase, notwithstanding the fact that Germany has taken very little, while formerly that country was our largest customer. Some alarmists saw in this falling off in the demand from that direction a virtual ruin of the export trade, but other markets have been opened, and the shipments have steadily increased.

The live-stock trade of Cincinnati during the year ended 1st inst., as shown by the annual statement, comprised 88,703 hogs, 38,000 cattle and 203,420 sheep. This is a reduction of 63,000 hogs and 42,000 sheep compared with the previous year, but in cattle there is no considerable decline.

The President appointed Chas. D. Jacobs, of Kentucky, to be Envoy Extraordinary and Minister Plenipotentiary of the United States to the United States of Colombia. Mr. Jacobs is about 55 years of age. He was twice elected mayor of Louisville, and was a prominent candidate for the gubernatorial nomination in 1884.

Captain Eads says his Nicaraguan railroad project is moving slowly. He is waiting for important legislation in Mexico.

Michigan produced during the last 10 months 2,553,000 barrels of salt, which is largely in excess of the production ever recorded for a corresponding period.

Among the codfish kings of the Eastern Coast, perhaps the firm of C. Robin & Co. are foremost. A hundred years ago Charles Robin, a native of the Isle of Jersey, began the fishing business in a small way on those shores. The firm prospered mightily. They now own six fishing establishments on the south shore, as many more on the north shore of the St. Lawrence, and one in New Brunswick. Their shipping includes about 20 square-rigged sea-going ships, 8 or 10 coasting schooners and nearly 300 fishing-

boats. It is estimated that they have in their employ between 3000 and 4000 men.

Many merchants of Chicago and other distributing points in the West strenuously object to the present system of the transportation companies, by which a lower rate is charged as freight on an entire carload of any given article than on a quantity less than a carload consignment composed of various classes of merchandise. The Northwestern jobber, it is pointed out, taking advantage of the difference in rates, orders his stock by the carload, gets the lower rate and sells accordingly, to the detriment of smaller competitors.

Dr. Carroll, of the State Board of Health, has telegraphed the local Health Commissioners at Niagara Falls and Suspension Bridge not to allow any one to cross into this State without showing indications of recent vaccination. The practical effect of this order is to quarantine Canada from this country, and for a time may seriously affect business relations. Dr. Carroll says the measure is "perfectly legal."

A statement showing the operations of the Patent Office during the fiscal year ended June 30, 1885, prepared by Commissioner Montgomery, shows that the number of applications for patents received was 32,662; for designs, 1071; for reissues of patents, 156; for trade-marks, 1126, and for labels, 673, making a total of 35,688, against 38,832 during the preceding year. The number of caveats filed was 2515. The number of patents granted, including reissues, was 22,928; of trade marks registered, 1092, and of labels, 337, making a total issue of 24,357. The receipts of the office from all sources were \$1,074,974, as against \$1,145,433 during the preceding year, while the expenditures were \$934,123, leaving a surplus of \$140,851.

At a sale of timber lands in Ottawa, 8th inst., 1190 square miles only realized \$247,000. These limits, which are mostly on the Kippewa River, are regarded as the best in the lumbering district, and the extremely low price at which they were sold is attributed to the general depression in the lumber trade.

It is stated that a large Western car shop which captured a very extensive order for cars for a Western road by naming an exceptionally low figure has called for bids from car-spring manufacturers. The specification is such that, as a spring maker affirms, the material will not last six months. We understand that some have declined to compete for furnishing so poor an article.

The confiscated silver mines at Los Cenaz, Mex., have been restored to their owners through the intervention of Secretary Bayard, who made a formal demand upon the Mexican Government.

Statistics compiled with the object of adding interest to the celebration of the opening of Davis Island dam, last week, show that Pittsburgh's annual business is valued at one-sixth the total imports of the United States, while the waters of the Allegheny, Monongahela and Ohio float a navy whose tonnage is equaled by that of few seaports.

Another cargo of teas is about to load in Yokohama for Puget Sound, the terminus of the Northern Pacific Railroad, and it is probable that within a few months a regular line of steamers will be established on the route.

The depression in the Lancashire cotton mills deepens rather than improves. A large proportion of the machinery is idle.

The Court of Alabama Claims is making strenuous efforts to conclude its labors as soon as possible.

Turkey is making vigorous war preparations. Two powerful armies are in advantageous positions for advance into both Bulgaria and Eastern Roumelia, or to check any attack from other Balkan States. At the same time it is still hoped that peace will be maintained.

Birmingham, Ala., is preparing for a world's exposition to be held in 1887. It is designed to call the attention of the capitalists of the world to the wonderful mineral richness of Alabama. One fine building in which exhibits will be stored has already been erected.

The total population of New Jersey, as shown by the State census just completed, is 1,278,033, the males numbering 635,186, and the females 642,847. The native-born white population is 985,846, and colored, 41,841. The foreign-born Irish population is 95,140. Germans number 89,745. The population of the State in 1880 was 1,131,116, the increase in five years being 146,917, or about 13 per cent. The largest increase is in Hudson County, over 27 per cent.

The population of Cincinnati is now estimated at 301,423: including suburban villages, 450,500.

Four steamers employed during the past season catching whales off the coast of Maine and Massachusetts have taken about 50 of them, averaging 25 tons in weight and yielding oil and bone valued at \$400 each.

Encouraged by the success of Russia in carrying petroleum in bulk by means of tank vessels built for the purpose, this method of transportation is receiving another trial in New York. Two cargoes sent out a few years ago never reached their destination, but now an entirely different plan has been

adopted both in the size and arrangement of the tanks, which it is claimed will entirely overcome the difficulties previously encountered. In the first instance large bulkhead tanks were used, but the present plan is that of small separate tanks that will distribute the weight and thus prevent the shifting of the entire cargo with the rolling of the vessel. The objections are that vessels thus fitted must be reserved exclusively for oil, carrying cargoes only one way; and then there is the difficulty of discharging cargo in case the vessel is disabled.

Lieutenant Danenhower, of Arctic fame, in a paper on "North Polar Researches," takes the ground that there is no continent yet undiscovered in the North Polar basin, and the scientific knowledge yet to be obtained is not worth the loss of life and treasure that will be required for future expeditions.

A late telegram from Toronto says the Canadian Pacific will be opened for freight traffic 18th inst., and on November 2 the whole line, from Montreal to Kicking Horse Pass, 2394 miles, will be in operation.

The traffic through the Sault Ste. Marie Canal during the month of September exceeded that of the Suez Canal by 30,000 tons—a larger business than heretofore known in its history—as follows:

Steamboats.....	574
Sail vessels.....	309
Rafts and unregistered craft.....	29
Total.....	912

The aggregate of registered tonnage was 531,689, and freight tonnage 553,811, all of which was passed through the new locks.

The new union depot about to be built in St. Louis will be one of the largest and finest in the country.

Charles Hinkeldeyn, an *attaché* of the German legation in Washington City, who has been investigating the natural gas in Pittsburgh and the industries affected by it, with the object of making a report to his Government, says: "The use of natural gas as a fuel is something new to me, but I should say, from what I have seen of it, that Pittsburgh is destined to become the greatest manufacturing city of America. The supply apparently is inexhaustible."

A project for converting Paris into a seaport town has been discussed at intervals for some years past. The scheme has just advanced a stage, and surveys have been made of the site upon which it is designed to place the docks. From Boulogne to the capital it is proposed to cut a canal navigable for vessels of considerable tonnage, and this canal is to terminate upon the Plain of Pantin in a chain of docks and wharves, to which, says an enthusiastic advocate of the scheme, "even those of Antwerp itself would not be comparable."

The rapid increase of the order known as the Knights of Labor is shown by the report of their secretary, presented to the General Assembly at their recent session in Hamilton, Ont. The membership increased 75 per cent. during the year ended June 30; 7041 assemblies were organized, 31 reorganized and 164 lapsed.

A Tacoma editor describes wonderful wheat from Puget's Sound. The stalks are seven-headed, 6 feet high, and the grains counted from a single head numbered 161. According to this, one kernel of wheat yielded 966 plump, fat grains, or nearly one thousandfold. The yield per acre of this wheat was 85 bushels.

"Midget locomotives" for plantation use are said to be superseding mules. One of them weighs only 3 tons, and they are used on rails which weigh 12 pounds to the yard. The cylinders are only 10 inches long. These little engines are not confined to wood for fuel. As lumbermen, they burn wood. As plantation engines, they frequently burn refuse sugar cane. In a different form, but with the same diminutive cylinders, they are used in coal mines for hauling cars, and burn either soft or hard coal or coke. In their smallest sizes they are only 10 feet long over all, 4½ feet high and 5 feet wide. A few bushels of coal and a few pails of water keep them running all day. One of these moles in a coal mine at Brookfield, Ohio, pulls 20 cars, weighing nearly three-quarters of a ton each, up a grade 1360 yards long that rises at the rate of 105 feet to the mile.

The revenue of the Dominion for the three months ending September 30 amounted to \$7,336,739, a decrease of \$1,322,687, as compared with the corresponding period of last year. The expenditures for the same period were \$7,990,137, an increase of \$1,265,693, as compared with the corresponding three months of 1884.

The walking delegates of the Amalgamated Building Trades reported to the Central Labor Union on Sunday that they were going to try and break up the New York Trade Schools, at Sixty-seventh street and First avenue, where the bosses teach boys the building trade and then employ them at low wages.

At Wilkesbarre, Pa., last week, Judge Woodward read an opinion in the case against Christian Conrad, a mine boss at the West End Colliery, at Mocanaqua, recently arrested for negligence and for being responsible for the death of 10 men who were suffocated by foul gas on the 11th of August last. Judge Woodward holds that Conrad was guilty of negligence and of an

offense against a provision of an act of Assembly of the 30th of June, 1885, and said that the only thing that remained for the court to do was to impose sentence.

Professor Crosby finds that the bed of the Potomac River is 16 feet higher than it was in prehistoric times. He has devoted considerable time in studying the oyster-shell banks near Pope's Creek. He estimates that there were originally 3,000,000 bushels of oyster shells gathered in one pile on the Maryland side, and over 1,000,000 bushels in one pile on the Virginia side.

The largest cotton plantation in the world is E. Richardson's, of Mississippi. He owns plantations in the Mississippi Valley that in ante-bellum days were valued at nearly \$12,000,000—among them the famous Wade Hampton plantation. They are valued now at \$1,000,000.

The activity in the petroleum fields was seldom much greater than at present. From Allegany County, N. Y., to Washington County, Pa., operations are being pushed with a vigor unknown for more than three years past. There is not an experienced driller or tool-dresser in the entire region unemployed. The continuance of the crude market at about \$1 is the immediate cause of this condition of affairs, or primarily the absence of gusher territory. It is noticeable, however, that exporters refuse to come in for large quantities of petroleum at the existing high prices.

The German Workingmen's Progressive Union, in Philadelphia, composed of young German mechanics who have recently arrived in this country, have organized a free night school for the instruction of the members in the English language and to furnish general information relative to trade organizations.

It is demonstrated that bamboo culture in California is practicable.

No less an authority than Prince Bismarck rebukes the practice of making autographs illegible. He has issued a decree in which he calls the attention of gentlemen who have occasion to put their signatures to official documents that some of these names may to them appear equivalent to a signature, but are to everybody else unintelligible. He then insists that every public officer shall so write his name that it can be plainly read at the first glance.

A member of the British Parliament, in a private letter received in this country, says: "The silver question compels attention by the fall of the Indian exchange to 1/6½, or even 1/6, a fall of nearly 20 per cent. within a short period, although the drawings of the home Indian Government have been very light since the 1st of April. I suppose there is a prevailing fear about your proposed repeal of the Bland act. There is also a fear, apparently well grounded, that silver is falling intrinsically by reason of the quantity brought to market and the low charge of mining."

Terrible prairie fires, causing great destruction of property, are again reported in Pierce, Cedar, Wayne and Knox counties, Dak. Three fires were started near Bismarck, on Friday, it is thought, by sparks from railroad engines.

The cable companies are suffering from the depression in the news markets. To supply the wants of the Transatlantic trade there are 10 cables in operation, and of these six are susceptible of the duplex system, so that there are actually 12 at the service of the public. The competition between rival companies becomes unprofitably diffused, while the expenses have to be maintained at high-pressure point.

Three leading stockholders of the Standard Oil Co. were charged with conspiring to ruin the business of a rival at Buffalo, and in a civil suit the jury brought in a verdict of \$50,000 for the plaintiffs.

Commissioners have been appointed to condemn lands on the route of the proposed canal to unite Delaware and Chesapeake bays. The canal will be 17 miles long and cost \$8,500,000. Its dimensions will be as follows: 100 feet wide, 26 feet at low water, side slopes 1½ to 1 foot, with berms on one side 12 feet wide and 30 feet above bottom.

Jay Gould professes to deprecate a combination of railroads. "What we want in this country," he says, "is just what we have got, sharp competition, but the competition should be confined to soliciting business on an agreed basis of traffic tariffs."

The Bermudas have an unenviable reputation for extortion where vessels arrive in distress. First, the Government fees must be paid. The red tape of an old-time officialism, involving costly delays, has to be gone through, and, if the vessel is leaking and must discharge her cargo, the merchandise has, of course, to be stored, in which case the warehouseman collects just what fees he may deem proper. The ship must then undergo the necessary repairs, and the charges for this work, it is averred, are simply outrageous. The evil, however, is less serious than formerly.

The Mayor of St. Louis, in responding to the business men of the city who called upon him for the protection of their interests from the riotous acts of car-strikers, replies that the authorities are competent to suppress any form of lawlessness, but he advised

the committee to be sworn in as special constables. The Mayor also stated that no street-car men or Knights of Labor will be accepted as special policemen. He further stated that under the law of Missouri the upsetting or destruction of railway cars is a felony, and that he favors the prosecution of the rioters arrested to the full extent of the law.

Cyrus W. Field, after witnessing the third public trial of the electric motor, said: "I am convinced that it is a great success and will in time make great encroachments on steam-power."

The Minnesota and Northwestern Road has completed its bridge across the Mississippi River, at St. Paul, in the remarkably short time of 10 months. The bridge is of iron, 1825 feet long, and the draw span, 412 feet long, is the largest and heaviest in the world. The cost of the bridge was \$350,000.

The new cable road in Kansas City is carrying between 9000 and 10,000 passengers a day, and is pronounced a complete success.

Nearly 250,000 wooden fruit boxes, intended for shipment to Palermo, Sicily, were burned near Bangor, Me., on the 12th inst.

Special Timber Agent Haley, in his report to the Government, directly charges that the Northern Pacific Railroad Co. and their creature, the Montana Improvement Co., have stolen in the form of timber, railroad ties, shingles, cordwood, and cedar posts over \$600,000 worth of property from lands belonging to the Government.

The California State Fair at Sacramento afforded an excellent display of the resources of the Golden State. The total receipts were \$25,272. The exhibition of machinery was unprecedentedly large, and, in addition to irrigation pumps and agricultural implements from the Union Foundry and other establishments, there was shown a machine for manufacturing barbed wire in full operation. Progress in fruit culture is almost unexampled. Of raisins alone the product for 1885 will exceed 250,000 20-pound boxes, and the crop within five years will be worth from \$3,000,000 to \$5,000,000. Of grapes there are now 150,000 acres under cultivation. Calculating a full crop at an average of 3 tons, the wine product within the next five years will reach 65,000,000 gallons. Shipments of green fruit from the State this year will amount to not less than 35,000,000 pounds.

The Daft electric motor is working well in Baltimore, as we learn through H. M. Hawkesworth, general manager. Two engines are constantly in service, performing in all conditions of weather and carrying a carload of 65 passengers over heavy grades and sharp curves at the rate of 6 or 8 miles an hour. The manager says: "From what I have seen of this system of electricity for running cars, I am satisfied that cars can be run as many days in the year by the electric motor as they can be by the steam motor, or, say, the cable, horse or mule power." The advantages claimed for these motors to the public are greater speed and less dirt; to the railway company, greater service and less expense than horses and mules. The only defect spoken of is in the mechanical strength of the armatures in the motors, which are being strengthened.

An important case bearing on the responsibility of an employer for injury sustained by an employee was recently decided by the Supreme Court of New Jersey. The suit was brought to recover damages for the death of a minor employed in running a machine in a Newark factory. It was occasionally necessary to displace and replace the belt by which the power was communicated from a revolving shaft. He was directed always to call some one to assist in the operation who might hold the belt in place on the machine while he stood behind the shaft and adjusted the belt upon the driving-wheel. On one occasion, although assistance was within call, he attempted to replace the belt alone without asking aid, and was caught in the belt and killed. The court held that he was guilty of contributory negligence, and that his representative could not maintain an action for damages.

The Java sugar crop just gathered amounts to 574,389 tons. There are 100 sugar mills in the country.

A world's fair of a novel sort is to open at Liverpool, England, next May, the design being to illustrate on a grand scale the history and evolution of traveling by land, sea and air. In the department of sea travel will be shown models of ships and boats of all ages and countries, models of docks, harbors, light-houses, life-saving apparatus, &c. The department of land travel will contain chariots, coaches and carriages of all times, and there will be shown, by an interesting exhibit, the history of the development of steam as a motive-power.

Chief Engineer Martin, of the East River Bridge, has obtained authority to increase the engine-power for the traction rope and to make the necessary changes.

The Treasury decides that old copper sheathing and other worn out metal equipments from vessels are not, when bonded, importations within the meaning of the law, and therefore not subject to duty. Collectors are instructed accordingly.

A sign of the times is the fact that the Knights of Labor elected their entire school ticket in Norwalk, Conn.

Trade Report.

New York Iron Market.

American Pig.—The tone of the market is unchanged. The bulk of the business done is in small lots, larger sales being of rare occurrence. There is no pressure to sell and no anxiety on the part of buyers as to future supplies. We hear comparatively little in this market of Southern Irons. Those the quality of which has proved satisfactory have been accorded their place, while other grades are not much used. We quote standard brands of Lehigh and North River Irons, tidewater delivery, nominally as follows: No. 1 X Foundry, \$18 @ \$18.50; No. 2 X Foundry, \$16 @ \$16.50; Gray Forge, \$15 @ \$15.50; the outside figure is asked for special brands. Outside brands sell for 50¢ @ \$1 less than our quotations.

Scotch Pig.—Usually there is at this season of the year a more liberal buying movement on the part of those consumers who must lay in winter supplies before the close of navigation. There has been a little of it this year. We quote nominally as follows for round lots: Coltness, \$19.50 @ \$19.75 to arrive; Gartsherrie, \$19.50 to arrive; Shotts, \$19.50 @ \$19.75 to arrive; Carnbroe and Glengarnock, \$18.50 to arrive; Summerlee, \$19 @ \$19.25 to arrive; Dalmellington, \$18 @ \$18.50 to arrive; Eglinton, \$17.50 @ \$18 to arrive, and Clyde, \$18 @ \$18.50 to arrive.

Bessemer Pig.—The Cornwall furnaces, having sold up to the close of the year, have nominally advanced their price \$1 7/8 ton. In Foreign Bessemer there has been no business. In Spiegeleisen there have been sales of small lots, spot or prompt delivery, at \$26, and we hear of a sale of about 2000 tons American Spiegeleisen, winter delivery, at private terms. The sale is reported, too, of a lot of 100 tons of 70 @ 75 % Ferromanganese. We quote 20 % Spiegeleisen fairly firm at \$25.75 @ \$26.

Bar Iron.—It is reported that slight concessions to old customers are again becoming more prevalent. The market has lost a part of the better tone which it had acquired. We quote for delivery here in round lots: Common Iron, 1.45¢ @ 1.55¢; Medium, 1.55¢ @ 1.65¢; and Refined Iron, 1.75¢ @ 1.9¢, with half extras. Concessions from these figures are very difficult to obtain. Store prices are 1.6¢ @ 1.75¢ for Common, 1.75¢ @ 1.8¢ for Medium, and 1.9¢ @ 2¢ for Refined.

Structural Iron.—A fair volume of business has been done, there having been sales of round lots of Beams and of Angles. Prices throughout remain stationary. Angles may be quoted nominally 2¢ @ 2.1¢, delivered, for round lots, and Tees at 2.25¢ @ 2.4¢. Store quotations remain 2.2¢ @ 2.4¢ for Angles, and 2.5¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders.

Plates.—The market is quiet. We quote for round lots: Common or Tank, 2.05¢ @ 2.1¢; Refined, 2 1/4¢ @ 2 3/4¢; Shell, 2.4¢ @ 2 1/2¢; Flange, 3.4¢ @ 3 1/2¢; Extra Flange, 4¢ @ 4 1/4¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2 3/4¢ on dock; Boiler, 3¢ @ 3 1/4¢ for Shell, 3 1/2¢ @ 4¢ for Flange, and 4¢ @ 5 1/2¢ for Extra Flange and Fire-Box.

Merchant Steel.—Quotations for the range from ordinary to good grades are as follows: American Tool Steel, 7 1/2¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2 1/4¢ @ 2 3/4¢; Open-Hearth Machinery, 2 1/4¢ @ 2 3/4¢; and Bessemer Machinery, 2¢ @ 2 1/2¢; English Tool, 13 1/2¢ @ 15 1/2¢; Common grades, 7¢ @ 9¢.

Steel Rails.—Reports of very large sales are exaggerated. It is believed by those well informed that the contracts actually closed do not exceed, if they reach, 45,000 to 50,000 tons. Eastern and Western mills taken together. The majority of the mills freely accept \$30 at mill for delivery during the first six months of 1886. Opinions as to the future differ considerably. The view is often and emphatically expressed that \$35 will be the prevailing figure in spring. On the other hand it is urged that if the demand should become so active as to warrant such an advance the Board of Control of the association would promptly increase the allotment. It is insisted that the Rail-producing capacity of the mills is considerably exaggerated, because so large a proportion of the Steel made is now diverted from the Rail mills for structural purposes.

Steel Wire Rods.—There have been some sales of fair lots during the current week. Under "Foreign" in another column we print a report from Dortmund, Westphalia, on the combination of Wire-Rod manufacturers formed there. We quote here \$41.50 @ \$42.

Steel Wire Billets.—We note a sale of 5000 tons of Domestic Wire Billets at private terms.

Old Rails.—No business has been reported. We quote nominally \$17 @ \$17.50.

Scrap.—The market is unchanged at nominally \$18 @ \$18.50.

Rail Fastenings.—The principal Spike manufacturers East and West have held a number of meetings during the current week in this city, with the object of putting the business on a more satisfactory basis. A

final decision had not been reached as we go to press. We quote for large lots 1 9/16¢ for Spikes; 2.55¢ @ 2.65¢ for Bolts and Square Nuts; 2.75¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.65¢ @ 1.7¢ for Splice Bars.

Metal Exchange.

The following transactions have been reported as having taken place on the floor of the Metal Exchange:

THURSDAY, October 8.	
5 tons Tin, November.	30.10¢
10 tons Tin, December.	19.95¢
FRIDAY, October 9.	
5 tons Straits Tin, October.	30.55¢
5 tons Australian Tin, October.	30.65¢

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, October 13, 1885.

Business during the week has been rather quiet, and, while there is no loss of confidence in the ultimate outcome, there is some disappointment at the hesitancy which has prevailed during the past two or three weeks. The general position is much better than it was three months ago, and the outlook has shown no unfavorable features, but for some reason orders are irregular and uncertain and prices not more than steady. Some departments of business have picked up considerably; others, and perhaps the majority, say that things are only slightly better, but there is not a single instance in which it is said that business is worse than it was three or four months ago. Taking everything into consideration, therefore, the claim that business is reviving appears to be well founded. The tendency of prices has been equally uniform—some more, some less—but all upward. The movement is slow, and it is hoped, will remain so, as there is not the slightest probability of a famine either in Pig Iron or of Pig-Iron products. Every dollar per ton advance will increase the supply, and, with such an enormous capacity ready to be utilized, the utmost caution will be necessary to keep production within the legitimate requirements of consumers.

Pig Iron.—It is difficult to define the exact position of the market, except that every one feels absolutely certain that the lowest figures have been touched; beyond that there is hesitation and uncertainty. Large buyers show a disposition to duplicate their former purchases, but have not made up their minds to pay the advance which is demanded. The smaller class of trade whose supplies are exhausted have no alternative, but the aggregate amount taken is a little disappointing to sellers. Nevertheless, the chances appear to be in favor of firm prices, as there are large orders to be filled, and continued inquiries from leading consumers indicate a disposition to buy on soft spots, which will at least sustain the market, if nothing more. Important and almost imperceptible changes have been in progress for some time past, and still more important results may be developed as the season advances. The demand for Iron for the Bessemer Steel companies is becoming an important factor to Pennsylvania furnaces, and may have considerable influence in shaping the course of prices in the near future. Until recently hundreds of thousands of tons of Pig Iron were imported by the Bessemer companies, but the demand has now virtually ceased. A large proportion of their supply is now made in their own stacks, the balance taken chiefly from the Cornwall furnaces. Large contracts have been made recently, so that the supply available for rolling mill purposes will be decreased accordingly, and an advance in its price or its diversion into other channels will be of no little advantage to competitors. In other words, if 50,000 or 100,000 tons or any other quantity of Cornwall Irons are taken by the Bessemer companies, instead of the same quantity of foreign Iron, it relieves competition for the rolling-mill trade to the same extent. Prices of Cornwall Irons within a few days have been advanced \$1 7/8 ton, and, although its effect has not been felt as yet, it will doubtless have a tendency to confirm sellers in their belief in firm, if not higher, prices. Meanwhile, as we have already said, the demand has not been very active of late, but prices are firm at last week's quotations, say \$18 for No. 1 Foundry, \$16 for No. 2 and \$15.50 for Mill Irons, delivered at tide, or its equivalent. Choice brands command 50¢ @ \$1 7/8 ton more than above; outside brands at concessions of 50¢ @ \$1 less than standard makes.

Foreign Iron.—There is a good demand for Hematite Irons suitable for Open-Hearth Steel, and sales to the extent of 12,000 tons have been made on private terms. Nominal rates are \$19.50 @ \$20 asked for special brands, \$18 for Ordinary, and \$25.50 for 20 % Spiegeleisen.

Blooms.—The demand is light, asking prices as follows: Soft Basic Blooms, \$33.50 @ \$35; Billets, \$38 @ \$39, and Siemens-Martin, \$40 @ \$42; extra quality, \$43 @ \$45; Domestic Blooms, \$30.50 @ \$32, delivered, for Nail Plate, and \$35 @ \$36 for Plate and Sheet Blooms; Charcoal Blooms, \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$32 @ \$33; Northern Ore Blooms, \$32.

Muck Bars.—There is an active demand, and, with light offerings, prices are a shade dearer, say \$27 @ \$27.50 at mill for best qualities.

Bar Iron.—The feeling is less confident in this department, and in some instances parties who refused orders a month ago intimate their willingness to enter them now at the figures bid at that time. There is no

positive weakness, however, and, as there are a great many orders yet to be filled, mills are in no immediate danger of being short of work. Still, there is less urgency among buyers, and, for the present at all events, they are disposed to place orders sparingly until the outlook is more settled. Skelp Iron is in good demand, several hundred tons having been taken at 1.8¢, with additional orders on the market.

Plate and Tank Iron.—There is something of a lull in the demand for Plate Iron, and in cases where work is running out there is a disposition to shade prices on the chance of a good-sized order. In the majority of cases mills are pretty well employed, with orders to run for some time. The current demand for small lots is fair, and in ordinary cases quotations are as before, viz.: Ordinary Plate, 2¢; Tank, 2.1¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

Structural Iron.—There is a fair demand for small lots, but the market cannot in any sense of the word be called active. Deliveries for some time past have been larger than new orders, and in most cases the mills have less work on hand than they had a month ago. The outlook is fairly satisfactory, however; some new business is under negotiation, and at least the usual run of orders can be safely calculated upon. Prices are unchanged and may be quoted as follows: Bridge Plate, 2¢ @ 2.1¢; Angles, 2¢; Tees, 2.4¢ @ 2.5¢, and Beams and Channels, 3¢.

Sheet Iron.—There is a fair business doing, but not the same urgency as noticed for some weeks past. Stocks have been pretty well absorbed, however, and manufacturers are entirely satisfied with the volume of business, both present and prospective. Prices unchanged, as follows:

Best Refined, Nos. 26, 27 and 28.	33 1/2¢
Best Refined, Nos. 18 to 25.	35¢
Common, 1/2¢ less than above.	
Best Bloom Sheets, Nos. 36 to 38.	5¢
Best Bloom Sheets, Nos. 22 to 25.	4 1/2¢
Best Bloom Sheets, Nos. 16 to 21.	4¢
Blue Annealed.	2.75¢
Best Bloom, Galvanized, discount.	50 %
Common, discount.	62 1/2 %

Wrought-Iron Pipe.—The heavy demand still continues, and prices are maintained. The outlook favors an advance at an early day. Stocks are very much reduced and manufacturers are kept busy filling orders. Discounts unchanged, as follows: Lap-Welded Black Pipe, 60¢ off list price; Butt-Welded do., 42 1/2 %; Butt-Welded Galvanized, 32 1/2 %; Lap-Welded do., 42 1/2 %; Boiler Tubes, 57 1/2 %.

Nails.—The demand shows no abatement, that from the West being particularly heavy. Prices show an advance of 10¢ 7/8 keg over last week's report, with the prospects of a still further improvement. Stocks are very much broken, and dealers continue to have great trouble in filling orders. The card price is \$2.50, less the usual discount.

Steel Rails.—A large amount of business has been closed during the week—probably 40,000 to 50,000 tons distributed among the Eastern mills, besides large quantities further West. Prices are firm at \$30 at mill for large lots, with sales at \$30.50 @ \$31 for smaller quantities. Western mills report higher prices, but for suitable deliveries desirable orders can be placed in the East at \$30 for standard sections.

Old Rails.—Spot lots are wanted, but there are none immediately available; lots to arrive offered at \$17.50. There is a fair demand from interior points, with \$19 bid for several lots.

Scrap Iron.—Stocks are light, and under a moderate demand prices are firm as last quoted, viz.: No. 1 Wrought Scrap, \$17.50 @ \$18; No. 2 do., \$12 @ \$13; Horse Shoes, \$22 @ \$23; Turnings, \$13 @ \$14; Old Car Wheels, \$14 @ \$14.50; Old Steel Rails, \$16; Fish Plates, \$22 @ \$23; Cast Scrap, \$13 @ \$13.50; do. Turnings, \$10 @ \$10.50.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., October 13, 1885.

The general business situation remains unchanged. There is a good deal more cutting in some branches of manufacturing than there is any necessity for, and if manufacturers only had more confidence in each other a considerable proportion of it could be obviated. The great event of the past week was the formal opening for business of the Davis Island dam, in the Ohio River, near this city. The dam is the largest in the world, and it promises to be a complete success. To have a good navigable stage of water in our harbor is a most important matter, and will be of great advantage to general business. Those of our manufacturers whose works are located on the river banks, as many of them are, will be greatly benefited in the matter of transportation, which in these days is an important factor in manufacturing. The matter of freight rates often decides whether an order is to be placed here or elsewhere. General Negley, our Representative in Congress, says that at the next meeting of Congress he intends to take action with a view to have the Government buy out the Monongahela River Slackwater Company and make the navigation of the Monongahela free. This is a most important matter to the Coal trade of Pittsburgh.

Iron Ore.—The Ore trade here in Pittsburgh continues quiet, and it is evident that it will remain so during the remainder of the present year.

Pig Iron.—There has been no important change in the general position of the market

during the past week; business continues fairly active, there is no apparent falling off in the demand, and the market is steady, but prices remain unchanged. Consumers as a rule do not appear anxious to anticipate future wants, but furnacemen are just as indifferent in regard to contracting for future delivery. Shoenberger & Co. have started up one furnace within the past few days. The product of the Lucy Furnaces is being used chiefly by the mills owned by Carnegie Brothers & Co., who also own the furnaces, and the same is to a considerable extent true of the Isabella, Carrie and Eliza furnaces. We quote prices as follows:

Neutral Gray Forge.	\$14.50 @ \$15.00, 4 mos.
All-Ore Mill.	15.50 @ 16.00, 4 "
White and Mottled.	13.50 @ 14.00, 4 "
No. 1 Foundry.	16.50 @ 17.00, 4 "
No. 2 Foundry.	15.00 @ 15.50, 4 "
All-Ore Foundry.	17.50 @ 18.00, 4 "
Charcoal Foundry.	20.00 @ 22.00, 4 "
Cold-Blast Charcoal.	23.00 @ 26.00, 4 "
Bessemer Iron.	17.00 @ 17.50, 4 "

Muck Bar.—There has been considerable activity in Muck of late, but no improvement in prices, which we continue to quote at \$26 @ \$27, cash, according to quality and delivery.

Manufactured Iron.—Trade keeps up well, but it is feared that orders will commence to fall off before the close of the present month. At present the mills are nearly all in operation, some of them working double turn, but prices are no better. We continue to quote Bars at 1.60¢ @ 1.70¢ rates, 60 days, 2¢ off for cash. We can report sales of Skelp Iron at 1.75¢ @ 1.80¢. The Sheet mills continue to have about all they can do, but now is their busy season, and it will soon be over.

Nails.—The strike in Pittsburgh still continues, with but little prospect, apparently, of its being brought to an early termination. Manufacturers express a determination to fight it out if it should take all winter, and, so far as we can learn, there is no evidence of weakness on the part of the strikers, notwithstanding they have been out of work going on five months, and it is evident that many of them are low in funds. At Wheeling and at other points along the Ohio River a number of factories are being operated non-union, and, it is said, with a very fair show of success. Here we have no Nails except some small lots brought from a distance by jobbers. At Wheeling Steel Nails are being sold in car lots and upward at \$2.15 rates, 60 days, 2¢ off for cash.

Wrought-Iron Pipe.—While there is a falling off in new business, the mills are all busy, and some of them are reported sold up to the 1st of December. Prices here are firm at full combination rates, but it is rumored that Western jobbers have commenced to cut, which would indicate a falling off there in the demand. We continue to quote discounts as before: On Black Butt-Welded Pipe, in car lots and upward, 45 %; less than a car lot, 42 1/2 %; do., Galvanized, in car lots, 35 %; less, 32 1/2 %; Black Lap-Welded, in car lots, 62 1/2 %; less, 60 %; do., Galvanized, in car lots, 45 %; less, 42 1/2 %; Boiler Tubes, 57 1/2 %; 2-Inch Oil Well Tubing, 13¢ 7/8 foot, net; 5 1/2-Inch Casing, 40¢; 8-Inch Drive Pipe, \$1 30, net.

Old Rails.—We continue to quote Old Iron Rails at \$19 @ \$19.25. The last sale reported was a lot of 500 tons at \$19.25. Some operators quote the market firm at \$19.25, while others report that it is hard to get more than \$19. Old Steel Rails are scarce, and may be quoted firm at \$17 @ \$18, according to lengths.

Merchant Steel.—There is a continued fair degree of activity, but considerable complaining in regard to prices, which are not as satisfactory as they might be. Standard brands Refined Cast Steel, 8 1/2¢; do. Crucible Machinery, 4 1/2¢ @ 4 3/4¢; Open-Hearth and Bessemer do., 2 1/4¢ @ 2 3/4¢. Steel Nail Slabs, for which there is not much call, owing to the strike, quoted nominally at \$28.50 @ \$29 7/8 ton, cash.

Steel Rails.—There is no abatement in the demand for small lots for immediate near-by delivery, and for such the market is firm. Sales have been made at \$31 @ \$31.50, cash, at mill. Of course for delivery two or three months hence contracts can be made at prices considerably below those quoted, although some of the mills are reported sold up to next March and April. Some of the railroads are nearly always wanting more or less Rails at this time of year to put down as soon as possible, and for these there is no difficulty in obtaining strong prices.

Railway Track Supplies.—There is a fair trade; no change in prices. Spikes, 1.90¢, 30 days, delivered; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2.75¢ @ 2.85¢, the latter with Hexagon and former with Square Nuts.

Crop Ends, &c.—New Steel Rail Ends, in the absence of sales, are quoted at \$18.25 @ \$18.50, and Steel Bloom Ends, \$17.50 @ \$18. Bessemer Steel Billets, \$29 @ \$30 7/8 ton.

Scrap.—No. 1 Wrought is being sold at \$16 7/8 net ton; Selected Railroad, \$17; Wrought Turnings, \$13 @ \$14; Old Car Axles, \$22 @ \$23; Cast Borings, \$10.50 @ \$11, gross ton; Old Car Wheels, \$14.50, gross ton.

Window Glass.—Trade only fair; prices remain unchanged, as follows: Single-Strength, in car lots and upward, 70 and 10 %; Double-Strength, 75 and 5 %.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, October 12, 1885.

Hardware.—As predicted, the lull in the Hardware trade was broken last week. Monday morning's mails showed that coun-

try merchants had spent part of the closing hours of the previous week in writing orders. This augured well for a good week's business, and the trade was not disappointed. Business picked up remarkably, and the month of October promises at this time to be quite as good as September. The warm sun of the two previous weeks was succeeded by cold blasts and damp weather, which brought out a fresh and urgent demand for Stove Trimmings and the necessary articles in Hardware for finishing houses. Window Glass was in quite good request, as was also Tin Plate. The stiffening up in price of the Plate market caused large buyers to hold off, but the prospect that a further advance will soon be made does not improve their position. Prices on all other lines except Nails are inclined to steadiness, with no important changes to note.

Barb Wire.—The position of the market continues unchanged. Manufacturers, through their reluctance to accept orders for future delivery, are constantly strengthening the market without making any material change in price. The increased cost of Plain Wire makes it very desirable among manufacturers to obtain better figures, but the wide difference existing between makers prevents in a degree their harmonizing upon a system which will effectively promote this object. For this same reason the proposed combination which was inaugurated some time ago is making slow progress. So far as can be learned, manufacturers are not signing with the readiness that was expected, because they do not feel satisfied that their individual positions will be better than they would be providing they remained outside of the combination company. None of the manufacturers, however, are anxious to sell Wire, and only a portion of them are willing to take orders beyond what is necessary to keep their mills constantly employed. On this class of trade it is possible that current prices will rule firm for the balance of the year. On lots from store jobbers are quoted \$3.50 for Painted Wire and \$4.50 for Galvanized, these figures being shaded 1/4¢ @ 1/2¢ by manufacturers from mill.

Nails.—The market has been so diversified recently that trading can scarcely be summarized in a way that would express the position of all dealers. At the beginning of last week some houses were asking \$2.50 for Iron Nails and \$2.65 for Steel; others \$2.60 for Iron and \$2.75 for Steel. A day or two later prices were uniformly advanced to \$2.65 for Iron and \$2.75 for Steel. One other house made \$2.75 a special price on 8d., 10d., 20d. and 30d. on Iron, selling the balance of them at \$2.65. From this it will be seen that no one price would apply to the whole trade, as each concern was governed by individual circumstances. At the meeting of the city jobbers on Saturday last another advance was made which makes the uniform price on Iron Nails \$2.75 and on Steel Nails \$2.85. Some of the jobbers claim to have full assortments in fair quantities, but in order to keep their stocks up they have been compelled to pay 15¢ @ 25¢ 7/8 keg more than they did several weeks ago. Iron Nails have been offered, delivered here, by Eastern mills at figures ranging from \$2.75 to \$2.85, according to the location of the mill. If these prices are firmly adhered to jobbers will have to again advance their prices to cover stock purchased at these figures. Manufacturers claim to be as firm in their determination to conquer as ever, and the starting of the Kimberly Mill has not had any special effect upon trade beyond exciting curiosity as to the final outcome. Jobbers in Milwaukee are asking \$2.75 for Iron Nails and \$3 for Steel Nails, and have recently communicated with Chicago merchants with a view of having them concur in this price. It is not likely, however, that the two cities will concur upon any uniform figures, as they are more or less antagonistic in a jobbing sense.

American Pig Iron.—The market for Pig Iron during the week has been fairly active, although the demand has been largely for carload lots, there being no sales reported that cover more than 200 tons. There has been considerable demand during the week for Mill Irons, which has brought out the scarcity of this brand more prominently than has been noted heretofore. The supply of Coke Iron has also greatly diminished. Ohio Blackband Irons are still scarce, and the recent advance in price asked by the Brier Hill Co. places consumers who give this branch a preference in a position which they can scarcely appreciate. We learn that during the past week orders aggregating between 5000 and 6000 tons were refused at \$18.50, their price being \$19, with one lot of 100 tons having been sold at figures equivalent to \$19, cash, Chicago. It is said that these furnaces are producing about 1600 tons per week and cannot fill their orders. Summing up this class of Iron as a whole, furnacemen state that if they were to accept all the offers that are offered at present prices they would be sold one year ahead. From what can be learned, all the Ohio Blackband furnaces are firmly adhering to 50¢ advance on former prices with the exception of one or perhaps two, which would make the regular quotation in this market \$19, four months. On Lake Superior Charcoal Irons quotations continue at \$19 @ \$19.50, four months, dealers refusing to sell large quantities at better terms than they do carload lots. Furnaces that have advanced their price on this grade of Iron continue to be firm in their demand.

d Balls.—The demand was less urgent the week previous. Holders continue firm in their views, and are asking \$18.00 and upward for Chicago delivery, although a lot has been offered here at \$18.00. Buyers continue to quote \$17.50 @ \$18.00, are making some distinction as to the quality of the Rail. The North Chicago Rolling Mill Co. continue to quote \$17.25, and

cellaneous.—All the manufactories in the district are running full, and some of them on double-turn. The wood-working factories are working up to their fullest capacity, and there appears to be no cessation in the

CAR WHEEL.		
g Rock, Cold-Blast Char-	24.00 @	\$6.00
mos.		
Rock, Warm-Blast Char-	19.00 @	19.50
mos.	15.75 @	16.50
n Warm-Blast, cash.		
n Standard Warm-Blast,	22.50 @	24.50
n Standard Cold Blast,	25.00 @

October 1st, 1885, report as follows: It is more or less complaint of falling off in price, since the 1st of October shows but little improvement over the latter part of September. Still we think this lull is but about rather more by wet weather than haste in which all the farmers have been to harvest corn and tobacco before they should be injured by threatened frost. A relapse, too, from the first of Indian summer is apt to be accompanied with more or less indifference to work, and the generality of people for the stimulus of a little frosty snap putting forth their best energies. When these recurrent periods of comparative quiet are not without their compensations, for they enable us to gather up our ends and get stock and accounts in better shape. An interrupted rush is to be expected, nor would it be altogether wise. *Bar Iron.*—A trifling improvement may be noted, and that is all. There is only any better demand, so that whatever is asked is based upon the conviction that the previous prices meant a loss to the manufacturer. The activity of the iron mills, according to report, continues unabated, and the special privileges accorded them by the railroads, of which instances, indeed, they are part owners, in their advantage and against the mills of Ohio Valley and the North. Partial

to the British shipping trade is yet in this of depression, American shipping signs of improvement, which may be deduced in part by the recent national legislation lessening its disabilities. For England will ever fully recover its position as an ocean carrier is becoming of serious inquiry. A Glasgow correspondent says: "There is no blinking that foreign shipowners, encouraged in possible way—by bounty in France and subsidies in Germany—are making strides against the maritime supremacy of Great Britain, and are rapidly grasping trades which formerly found emporia for British seamen and investment of British capital. Foreign competition is increasing on the increase, and, though British shipping is being purged and purified and in the end prepared for a future revival, it is means certain that when trade impinges on the British shipowner will regain his position. The march of maritime supremacy has begun abroad, and to arrest it will be difficult, if not impossible. Even so, it is a fact, which had come to be regarded as a foregone conclusion, that the British shipowner, by being driven out of the race, is making a start as a way of profitable ocean carrying, a noble accomplishment in times like these, and concerning which many British shipowners would like to learn the secret."

Trade Report.

General Hardware.

A steady business is doing, without any specially new features, and with perhaps a slight falling off in volume. Prices remain substantially unchanged. Collections generally are fair, though a little sluggish in the South. Manufacturers are avoiding an accumulation of stock, and, with the uncertainty as to the future course of the market, are in some close lines reluctant to take heavy orders for future delivery.

NAILS.

The situation in the Western mills remains practically the same, neither party in the strike having made any substantial gains during the week. The Eastern mills and the few Western works running are finding it more and more difficult to supply the current demand, and stocks in manufacturers' hands and in stores are running so low that the scarcity is approaching a famine. Agents here report that they are confining themselves exclusively to efforts to fill the orders of their regular customers, and are in many instances finding it difficult to accomplish that. They generally ask \$2.50 per store for fair lots. During the week some of the holdings of jobbers have come out at lower figures than those generally prevailing. Business is confined to immediate requirements, but even this current demand is in excess of the supply and tends to making the scarcity greater day by day.

BARB WIRE.

The market has been very quiet, business being almost entirely confined to small lots. We quote for carload lots of Licensed Galvanized Four-Point Barb Wire 4.35 cents to 4.40 cents, and 4.55 cents to 4.60 cents for small lots. The Thorn Wire Hedge Co., of Chicago, have recently issued the following circular:

As numerous instances have been reported to us where the traveling men for jobbing houses have quoted prices on our goods and offered to furnish the same, we desire again to state that no jobbing house in the West handles our goods nor has any authority from us to quote prices on same. We make three styles of Barb Wire, and the quality of each is guaranteed as being of superior Steel and painted with the Kelly paint. We sell direct to but one agent in a place, putting the usual profit that is made by the jobber into the quality of our goods. Every spool of our Wire is branded with the trade-mark of the style of Wire it contains, and these trade marks are as follows: "Kelly" for the Wire with diamond shaped yielding barb; "S. & C." for the Wire with two pointed rigid wire barb, and "Red Star" for the Wire with four pointed rigid wire barb. Our Wire being so well known, we have decided to withdraw our traveling men from the road for the present.

HANDLED HOES.

As reasonable goods, information concerning which will be of interest to many of our readers, we give below the names and addresses of the leading manufacturers of Handled Hoes, intending in an early issue to refer to the different goods on the market more definitely and in detail. The manufacturers of this line are as follows:

AUBURN MFG. CO., Auburn, N. Y.
L. BOLLES HOE AND TOOL CO., Binghamton, N. Y.
BROWN, HINMAN, HUNTINGTON CO., Columbus, Ohio.
IOWA FARMING TOOL CO., Fort Madison, Iowa.
M. BARE, Hamilton, Ohio.
ASHTABULA TOOL CO., Ashtabula, Ohio.
LANE & GALE, Troy, N. Y.
C. E. MAYNARD, Northampton, N. Y.
GENEVA TOOL CO., Geneva, Ohio.
SMITH HAMPER, Philadelphia, Pa.

MISCELLANEOUS PRICES.

Screws are held very firmly, and the probability of another advance before long is intimated. No announcement is yet made of any action looking toward the adoption of a uniform list, but Hardwaremen, who are annoyed by the existing and needless confusion, are frank in saying that if the companies can so far agree as to maintain uniform and advanced prices for their own profit, they might at least unite on a list for the convenience of their customers.

There has been no recent change of importance in the Tack market, the Central Mfg. Co. and their outside competitors making energetic efforts to secure the orders of the trade. The system of the association in withdrawing quantity discounts and giving in their place specials, as in their judgment their customers may be entitled to them, is regarded as a shrewd one, and is reported to be working pretty satisfactorily. The outside makers are, however, selling a good many goods and giving specials with greater liberality. The completeness of the assortment offered by the Central Mfg. Co., as compared with the limited lines made by many of the outside companies, is an important feature of the situation.

A meeting of the File manufacturers is in session, and efforts are being made to adopt measures to secure advanced prices. This line of goods has been selling at such low figures for so long a time that it is to be hoped that something may be done.

Carriage Bolts are held by manufacturers at higher figures, and the market has a good tone. Goods can, however, in some cases be purchased from those who bought largely at former figures at concessions from the manufacturers' prices.

The following are the list prices and discounts of other Galvanized goods, besides those alluded to last week, manufactured by James Hill, Providence, R. I., whose New York office is with E. A. Holmes, 97 Chambers street. Attention is called to the fact that he has made improvements in the Star Ash Cans since last season, the Cans having welded top ring and strong grooved band around the center of the Can and at bottom, heavier body, and the well-known Star bottom:

Star Ash Cans, Galvanized—dis., 45%.	
No. 13, 18 x 18.....	Each, \$2.00
No. 14, 14 x 16.....	2.50
No. 15, 15 x 20.....	3.00
No. 16, 16 x 20.....	3.25
No. 18, 18 x 30.....	4.00
No. 18 1/2, 18 x 30.....	4.25
No. 20, 20 x 26.....	5.50
Cleared with wood, 75 cents extra, same discount.	

Galvanized Chamber Pails—dis., 35%.	
No. 2, 10 quarts.....	Per doz., \$8.50
No. 3, 12 quarts.....	6.00
No. 4, 14 quarts.....	7.00

Light Brass Hand Bells are selling at slightly lower prices than have prevailed, with a fair, though not especially brisk, demand.

The Excelsior Cutting Nippers, sold by C. E. Jennings & Co., 69 Reade street and 87 Chambers street, New York, and illustrated among the Hardware Novelties on page 29, are sold at \$2.50 per dozen, subject to a discount to the trade of 30 per cent.

Ewald Over, Indianapolis, issues a card, October 1, 1885, of special wholesale prices on goods made by him, embracing Sash Weights, Farmers' Boilers, Bob Sled Runners, Louisville Heating and Cooking Stoves, Farm Bells, Road Scrapers, &c.

The Black Hardware Co., Detroit, Mich. have issued a card noting the advance in Iron Nails, with dates as follows:

July 12.....	2.10 rates.
July 22.....	2.20 rates.
August 27.....	2.25 rates.
September 2.....	2.30 rates.
September 22.....	2.40 rates.
September 23.....	2.50 rates.
September 25.....	2.60 rates.
October 6.....	2.75 rates.
October 10.....	2.80 rates.

The New England Specialty Co., North Easton, Mass., manufacturers of Leavitt's Improved Tang Screw Drivers, of which we recently gave a description, are selling them in gross lots at the following prices:

Inch.....	1 1/2	2	3	4
Per gross.....	\$1.75	2.50	5.00	6.50
Inch.....	5	6	8	10
Per gross.....	\$8.00	9.50	14.00	18.75
Leavitt's Patent Can Openers, per gross.....				
Kitchen Knives, per gross.....				
Shoe Knives, per gross.....				
All the above goods are packed in dozen boxes.				

Bright Wire Goods begin to show indications of irregularity, and the apprehension is expressed that the recent advance may not be maintained by all the manufacturers.

THE MODEL HARDWARE STORE.

The satisfactory arrangement of a retail Hardware store, so that it shall be both convenient as regards the disposition of the goods and attractive in their display, is not so easy a matter as that of many other lines, and the difficulty of combining the desirable points in the arrangement is frequently alluded to. Still, it is generally acknowledged that if more attention were given to these matters much more satisfactory results might be obtained, and greater convenience, economy and effect of display secured. We have from time to time given our readers suggestions from correspondents in the trade with reference to this matter, and these articles, which were all of a practical nature, were read with interest and attracted much attention.

But we desire with the co-operation of our readers to go into the matter more extensively and systematically, so as to cover, as far as possible, all the points connected with the arrangement of a Hardware store, and to prepare and lay before the trade carefully devised plans with many details and specifications relating to the most efficient and satisfactory methods of overcoming recognized difficulties and securing the best effects and greatest convenience. In this we solicit and rely upon the assistance of Hardwaremen who know the points required and are able to make practical suggestions which will be of value. Some who have especially well-arranged stores will be kind enough to call attention to them and their special features of convenience; others will be aiding us in the enterprise by suggesting methods or details which they consider advantageous, and many, by letting us know the difficulties they experience and the faults they frequently observe in Hardware stores, will also render service in indicating the elements of the problem to be solved. These suggestions and hints we purpose to lay before our readers from time to time, illustrating them if advisable—as in the case of a simple and effective method of display suggested by an esteemed correspondent, and illustrated on page 29 of this issue—and when we have heard fully from the trade we intend to have carefully elaborated plans prepared by competent architects who will combine in these plans the different features of the model Hardware store, and indicate the best ways to overcome the difficulties suggested. These plans will then be laid before our readers, and will be of service, if not for adoption, at least in the way of suggestion to the trade at large.

Our readers will see that in attempting this we desire and depend upon the co-operation of Hardware dealers. We wish to secure from them, and earnestly request that they will favor us with, any suggestions or information bearing on the subject. But to put the matter plainly and definitely before them, we want information on these points, con-

cerning which (or others) we should be glad to hear from them:

1. Difficulties experienced in the arrangement of stores and display of goods, and faults or defects of arrangement.
2. Suggestions of desirable arrangement of store.
3. Suggestions as to desirable methods of storing or displaying the different lines.
4. The mention of any Hardware stores that are regarded as especially attractive and well arranged.

We shall esteem it a special favor if Hardwaremen will write us freely and fully on these points, giving the information or suggestions indicated above, which will be of especial value as informing us of the difficulties to be overcome, the ends to be secured, and methods that are found advantageous. We request, therefore, the freest possible discussion of the subject, and hope that every one who has what he considers a good idea concerning the arrangement of any detail will give us the benefit of the suggestion. We also trust that those who have some complaint to make against the way things are ordinarily arranged in Hardware stores, even though they have no improvement to offer, will write us. In the light of good ideas advanced and of objections made to current means of arrangement it will be possible at least to approximate the ideal store. We shall be glad to correspond with any of the trade in regard to this enterprise, and especially to hear from those who think they have a desirable arrangement of store and fittings at the present time, to the end that we may obtain plans of their stores, and suggestions that may be gathered from them, which may perhaps be suitable for publication in addition to the designs which we shall obtain from the architectural fraternity.

ITEMS.

H. W. Hill & Co., Decatur, Ill., have recently been annoyed somewhat by infringements on their patent for an improvement in Implements for Ringing Hogs, and are moving energetically against the infringers. They have within a short time obtained an injunction against a party who has been selling the infringing goods, and another case of the same general nature is still in the courts.

In regard to some delay there has been in the prompt shipping of goods, Sidney Shepard & Co., of Buffalo and Chicago, state that they have never employed more men in their factories than at present, but, notwithstanding, they have been obliged to work overtime in order to catch up with their orders. They are now, however, in better shape and hope to be able in future to supply their customers promptly. Their Barler Sifter, to which we have called the attention of our readers as constructed on a new principle, has kept one department of their factory busy.

E. M. Richardson, Waltham, Mass., is about to make a modification in his Hedges Sash Weights. The former steel top will soon be replaced by a malleable-iron one having large raised figures indicating the weight, and cast in so as to be securely attached. This is alluded to as an improvement involving no change in price. The demand for this line is referred to as large, and has called for an increase of capacity in his foundry.

The Detroit Stamping Co., Detroit, Mich., have sent out the following circular, which will be of interest to our readers as indicating a change in their method of marketing goods:

The marked growth of the disposition to buy from first hands has induced us to make the attempt to place our goods directly in the hands of dealers instead of through jobbers, as heretofore, giving our retail customers the benefit of the commissions allowed for selling our goods. We believe this method will better serve your interests and our own, and we hope for your assistance in this undertaking. We have recently sent you our new illustrated price list, to which we trust you will find it convenient to refer frequently. We undertake to save you the expense of boxing and to fill orders by mail at as low prices as we would quote, still our discounts will cheerfully be named on application.

The Humphreys Mfg. Co., Mansfield, Ohio, have just completed the erection of a two-story brick building 40 x 160 feet, which will serve as a warehouse and pattern shop. They are at present at work on a new catalogue of their goods, which will be, it is expected, issued in a week or two.

John Campbell, Manchester, N. H., issues a series of circulars describing his Wood Hitching Posts with Galvanized or Japanned Iron Tops, Stable Furniture and Wood Harness Pins. The latter articles are made with Japanned or Galvanized Iron Base and Brass Tips, and are from 6 to 9 inches in length.

THE KNAPP & COWLES MFG. CO., Bridgeport, Conn., successors to the Cowles Hardware Co., in their recent catalogue, to which we have already alluded, represent the following new goods of their manufacture: Screw Driver Bits, Square Reamers, Flat, Snail and Rose Countersinks, Weeding Hooks, Strawberry Forks and Garden Line Reels, Hester's Patent Carpenters' Gauge, Casbes' Nail Puller, Bright's Patent Combination Safeguard and Ventilator, Heavy Malleable I-Hinges, Flesh Forks, Saucepan, Mug, Cup, Boiler, Milk and Ash Can Handles, and Pail Ears; also Fruit Can Openers, among which the Imperial is alluded to as a new design. Screw Drivers, which are a leading line with them, are prominently represented, and they refer to their trade as having increased largely, and allude also to the variety of their patterns and the quality of the goods. The Black-Handled Screw Drivers with nicked ferrules, which are made in both flat and round blades, are described as of the most improved pattern and finish, and with the reduced list of the No. 4 round blade as being offered at exceptionally favorable figures. To their line of Mincing Knives, which now includes 24 different patterns, they have recently added eight new styles—a class of goods in regard to which they mention that they are successors of the original manufacturers of the first Mincing Knives made in this country. As indicating their variety of goods and the prices at which they are quoted, we give below their discount sheet, which applies to their catalogue of 1885, there being an additional discount of 2 per cent. for spot cash on receipt of goods:

Page.	Discount.
17, Awls, Ice, Nos. 2 and 3.....	50%
30, Awls, Carpenters'.....	50%
30, Awls, Marking.....	40%
20, Awls, Tinner's.....	50%
44, Boot Jack.....	50%
22, Box Openers.....	33 1/3%
32, Box Hooks.....	33 1/3%

Butts, Iron, Japanned.

32, Geer's Spring, Single and Double Acting.....	40%
32, Blank, Single and Double Acting.....	40%
Solid Bronze, Ornamented.	
32, Geer's Spring, Single and Double Acting.....	40%
33, Blank, Single and Double Acting.....	40%
33, Solid Bronze, Spring and Blank, Plain Finish.....	35%
31, Butts, Sensible Screen.....	65%

46, Broom Holder.....	50%
42, Butter Spades.....	50%
7, Countersinks, Flat.....	50%
7, Countersinks, Snail.....	50%
21, Countersinks, Common.....	50%
18, Carpenter's Gauge, Hester's.....	50%
9, Cold Chisels.....	25%
19, Carriage Jacks.....	50%
21, Carpet Stretchers, Bullard's.....	25%
21, Carpet Stretchers, Common.....	50%
45, Case Turners.....	40%
47, Corn Grater.....	50%
49, Can Openers, Common.....	50%
49, Can Openers, Imperial.....	50%
9, Door Stops, Wood.....	50%
34, Door Stops, Steel.....	net
35, Door Clamp and Bolt, Plain.....	60%
35, Door Clamp and Bolt, Ornamental.....	65%
14, Fork, Strawberry.....	65%
36, Gate Hinge.....	35%
8, Handles, Awl.....	35%
8, Handles, Chisel.....	35%
8, Handles, File.....	35%
50, Handles, Screw Driver.....	35%
51, Handles, Mug.....	per lb., net, 13¢
51, Handles, Cup.....	per lb., net, 14¢
52, Handles, Dish Pan.....	per lb., net, 12¢
53, Handles, Milk or Ash Can, with Lug and Stop.....	per lb., net, 12¢
54, Handles, Milk or Ash Can, Plain, with Lug.....	per lb., net, 12¢
55, Handles, Milk or Ash Can, Fluted, with Lug.....	per lb., net, 12¢
56, Handles, Boiler with Lug.....	per lb., net, 12¢
14, Hoe Shovel.....	25%
15, Hammock Rope Fast.....	75%
10, Hooks, Weeder.....	65%
15, Hooks, Hammock and S.....	80%
10, Hooks, Clothes Line.....	75¢ to 10¢
37, Hooks, Blind Screw.....	40¢ to 10¢
37, Hinges, Malleable T.....	60¢ to 10¢
12, Hinges, Steel Tack.....	40%
48, Hammers, Iron Tack.....	40%
11, Knives, Border.....	50%
38, Knives, Mincing, Sheet Steel.....	50¢ to 10¢
41, Knives, Mincing, Tension, Broad Blade.....	50¢ to 10¢
42, Knives, Mincing, Tension, Nar. Blade.....	70¢ to 10¢
43, Knives, Mincing, Forged.....	50¢ to 10¢
44, Lemon Squeezers.....	50%
14, Mouse Traps, per doz. holes.....	net, 15¢
19, Nail Sets.....	33 1/3%
23, Nail Puller, Casbes'.....	33 1/3%
46, Nut Cracks.....	60%
15, Patches, Solid.....	33 1/3%
15, Patches, Hollow.....	33 1/3%
24, Pruning Shears, Connecticut patent.....	55%
24, Pruning Shears, Clipper.....	55%
51, Pail Ears.....	per pound, net, 12¢
7, Reamers, Square.....	50%
25, Reamers, Round.....	45%
25, Springs, Hercules.....	40%
1, Tonzs, Ice.....	25%
5, Screw Drivers, No. 1.....	60¢ to 20¢
5, Screw Drivers, No. 2.....	60%
5, Screw Drivers, No. 3.....	40¢ to 10¢
5, Screw Drivers, No. 4.....	40¢ to 10¢
5, Screw Drivers, Sewing Machine.....	50%
5, Screw Drivers, Implement.....	net
7, Screw Drivers, Bit, Brace.....	50%
23, Scrapers, Box, Double Handle.....	45%
23, Scrapers, Box, Single Handle.....	50%
9, Scrapers, Plumbers'.....	33 1/3%
10, Trowels, Garden.....	65%
48, Tack Claws.....	60%
45, Vegetable Slicers.....	33 1/3%

CATALOGUES.

The Osborn Mfg. Co., 79 Bleeker street, New York, in their recent catalogue describe their extensive line of Bird Cages and other goods. They direct special attention to the quality of their manufactures as including only the higher grade of goods in their line. They have put on the market this fall Nos. 54, 54 1/2, 55, 55 1/2, 56 and 56 1/2, all of which are new designs of Brass. The general discount on the entire line is 40 per cent.

The National Wire and Iron Co., Detroit, Mich., have issued their autumn supplement showing the line of goods, Wire Cloth, Flower Pot Stands, Guard Stands, Ash Sifters, Rat Traps, Broilers, Stable Fixtures and other goods, to which they direct attention at this time. Among these goods is the "Sure Death" Rat Trap, which is made entirely of wire. They advise us that they have recently commenced drawing finer sizes of Brass Wire, in order to carry a suitable stock for making fine Brass Cloths. They have now four benches in full blast, and state that if the demand for their Brass Cloths continues they will have to add more. Sixty of their weavers struck for higher wages, although no recent cut has been made in their scale of prices. Not obtaining the increase asked for, they are still out, but their places are being rapidly filled by workmen from other cities, and the company expect to experience only a temporary inconvenience. The list covers an extensive line of goods, beginning with Flower Pot Stands and running through to Fences, Railings, Fire Escapes, &c. They also send out a circular to Hardware dealers, which may be of interest to some of our readers, in which they call attention to the fact that their goods, many of which come directly in the line of Hardware, afford a liberal percentage, and state that they have vacancies in all sections of the United States for pushing men to take

general agencies, and that with such liberal arrangements will be made.

Davis, Wilkinson & Co., Binghamton, N. Y., have issued their illustrated and descriptive catalogue of Children's Sleds, Express Wagons, Wheelbarrows, Rockers, Hobby Horses and Velocipedes for the season 1885-86. It shows an extensive line of these goods, which are illustrated and described, with list prices. In their introductory circular they allude to improvements which have been made in the goods, and call particular attention to the way in which certain styles of Sleds are braced, and also to their Steel Runner and Iron Knee Sled, No. 21, which they allude to as a metal Sled, especially light, strong and durable. The catalogue contains a cut and description of their No. 17X, 18X and 19X, which are new designs they introduced this season. These Clippers are described as made from the best oak or elm, having a hand-turned piece running nearly the whole length of the top, securely fastened by 10 tinned iron clips. Round spring shoes are used. The sides of this Sled are scrolled and the top board ornamented. Three styles are made—11 x 37 inch, 11 1/2 x 42 inch and 12 x 48 inch. Portland Cutters have also been added to their line this season, and are alluded to as making a stylish winter turnout to use in the place of a baby carriage, and as offered at a low figure. Smaller sizes of their "Jay Eye-See," No. 23, have also been added, and are designated as No. 24 and 24 1/2, which are respectively 11 x 42 inch and 10 x 36 inch, the No. 23 being 12 x 48 inch. Toy Wheelbarrows, Rocking Horses and "Shoefly" Rockers are also recent additions to their line, concerning which they advise us that on the two former articles they are now oversold. In "Shoefly" Rockers they state that they have aimed to improve on the stock article painted in rings, that has been on the market so long, and have endeavored to secure a better shape and style of finish.

The Empire Wringer Co., Auburn, N. Y., have recently sent out circulars to their customers showing the line of goods they make, to which they have recently added a Bench Wringer combining the Empire Wringer with their Folding Wash Bench, the advantages of which are alluded to.

The Crown Roller Skate Co., Decatur, Ill., issue an especially attractive catalogue in which the Skate is described, giving descriptions of the different styles they make and the special points on which they lay emphasis, with testimonials from the experts, and prices on parts, and some miscellaneous goods.

GOULDS & AUSTIN.

The following discount sheet has been issued by Goulds & Austin, 167 and 169 Lake street, Chicago. Covering, as it does, an extensive line of goods, it may be of interest to our readers. The discounts apply to their general catalogue, the pages of which are referred to:

1 to 7 and 9 to 14, Steel Goods.....	60% to 10%
8, Coke Forks.....	25%
14, Ferrules and Over Caps.....	25%
6, Wood Barley Forks, 4 fingers, per doz., net.....	\$4.25
6, Wood Barley Forks, 6 fingers, per doz., net.....	5.00
15, Wood Hand Rakes, No. 0.....	per doz., net, 1.45
15, Wood Hand Rakes, No. 1.....	per doz., net, 1.25
15, Wood Hand Rakes, No. 2.....	per doz., net, 1.25
15, Wood Hand Rakes, No. 3.....	per doz., net, 1.25
15, Wood Hand Rakes, No. 4.....	per doz., net, 2.15
15, Wood Hand Rakes, add for Mortise Heads, extra.....	3.50
15, Wood Hand Rakes, Oiling, extra, per doz.....	10¢
15, Handles, full stock, No. X.....	50¢ to 10¢
15, Snaiths.....	40¢ to 5¢
17, Scythes.....	50¢ to 10¢
18, Hay Knives, Cyclone.....	per doz., net, 8.50
18, Hay Knives, Lightning (should read Electric) Iron Back.....	per doz., net, 8.50
18, Hay Knives, Lightning (should read Electric) Steel Back.....	per doz., net, 11.00
18, Clipper Corn Knives.....	per doz., net, 2.10
18, X L Corn Knives.....	per doz., net, 2.10
18, Empire Corn Knives.....	per doz., net, 2.10
15, Grass Hooks, No. 2.....	per doz., net, 2.50
15, Grass Hooks, No. 3.....	per doz., net, 3.50
19 to 35, Grain Cradles.....	40¢ to 5¢
35, Cradle Fingers.....	per doz., net, 75¢
30, Austin Shovels and Spades.....	30¢ to 10¢
30, Amesbury Shovels.....	40%
30, Farmers' Friend Shovels and Spades.....	47 1/2%
30, Prospector Shovels and Spades, polished.....	50¢ to 10¢
30, Prospector Shovels and Spades, black, per doz.....	net, \$3.50
30, Austin Molders' Shovels.....	30%
30, Austin Pacific Mining Shovels.....	30%
30, Austin Coal Miners' Shovels.....	33 1/3%
31, Austin Coal Shovels.....	30%
31, Austin Socket Steel Grain Scoops.....	50¢ to 5¢
Amesbury All Steel Grain Scoops (not listed).	
Full polished, No. 4, \$6.20; No. 5, \$6.40; No. 6, \$6.60; No. 7, \$7.00; No. 8, \$7.40; No. 10.....	
31, Nicolai Iron Grain Scoops.....	
31, Austin Steel Trimming Scoops.....	33 1/3%
32, Austin Drain Spades.....	40¢ to 10¢
32, Drain Cleaners.....	30%
32, Tile Layer.....	40%
31, Austin Railroad and Tamping Shovels.....	30%
31, Austin Lock Lever, Self Dump Rake, 30-tooth, with Pole or Shaft, Wood Wheel.....	\$18.00
31, Austin Lock Lever, Self Dump Rake, 30-tooth, with Pole or Shaft, Steel Wheel.....	20.50
31, Austin Lock Lever, Self Dump Rake, 30-tooth, Wood Wheel.....	25.00
36, New Hollingsworth Lock Lever Self Dump Rake, 30-tooth, with Shafts or Pole, Wood Wheel.....	21.00
37, New Hollingsworth Lock Lever Self Dump Rake, with Shafts or Pole, Steel Wheels.....	25.00
36, New Hollingsworth Lock Lever Self Dump Rake, 30-tooth Wood Wheel.....	30.00
37, Greensburg Hay Rakes.....	net, 3.5
38 to 41, Tiffin Hay Rakes, 14 tooth.....	net, 8.30
39 to 40, Tiffin Hay Rakes, 16 tooth.....	net, 8.40
41, Austin Tedders.....	net, 35.00
42, Jordan Carriers.....	net, 4.03
42, Milwaukee Carriers.....	net, 3.50
42, Nellis Single Forks, each.....	net, 3.00
42, Nellis Double Forks, each.....	net, 2.50
42, Harris Double Forks, each.....	net, 1.

Axles, 9	Naylor & Co.	
Bands, 104	Tin boxes, 3,079	
Bundles, 88	Tin slabs, 944	
Bars, 3	Phelps, Dodge & Co.	
Cases, 8	Tin pits, bxs., 5,377	
Casks, 2	Taylor & Bros.	
	Zinc cs., 14	
Metals.	Tryon E. K. Jr. & Co.	
Bache Semon & Co.	Gun caps, cs., 3	
Tin, cs., 9	Westermann Budd & Co.	
Baring Bros. & Co.	Metal capsules, cs.	
Tin plates, bxs., 1,414		
Bartram Bros.	Wheeler, Soule & Co.	
Old metal, bxs., 3	Tin plates, 565	
Bloomfield, J. C. & Co.	Winter & Smillie,	
Case, 1	Plumbago, bbs., 26	
Dennis H. R. & Co.	Gun caps, cs., 491	
Tin plates, bxs., 250	Zinsser Wm. & Co.	
Field Alfred & Co.	Metalware, cs., 35	
Gun caps, cs., 41	Orders	
Finley H. R.	Tin plates, bxs., 519	
Pins, shds. (3)	Tin tappers, bxs., 5	
Hartley & Graham,	Tin slabs, 213	
Per, cs., 6	Antimony, cks., 35	
Morris L. W. & Co.		
Type, cs., 8		

The imports at this port of Cutlery, Hardware and Metals for the week ending October 9 were as follows:

	Quantity.	Value.
Anvils.....	130	\$1,600
Brass goods.....	740	51,400
Bismuth.....	4	2,000
Bronze.....	61	5,100
Chains and anchors.....	40	4,300
Clocks.....	157	14,710
Copper.....	2,468
Cutlery.....	109	36,720
Guns.....	17	2,000
Hardware.....	133	15,700
Iron, pig, tons.....	3,060	62,470
Iron, sheet, tons.....	822	127,350
Iron cotton ties.....	8,800	5,800
Iron, other, tons.....	1,240	48,400
Machinery.....	88	2,300
Metal goods.....	582	50,430
Nails.....	1	115
Needles.....	14	6,070
Old metal.....	660
Plumbago.....	659	7,640
Platina.....	1	2,210
Persecution caps.....	80	5,230
Pins.....	62	3,570
Quicksilver.....	700	16,730
Regulus antimony.....	150	7,640
Spelter, lb.....	110,344	4,360
Saddlery.....	42	4,920
Steel, other, tons.....	42,813	58,480
Tin, both, shds.....	270	253,630
Tin, 6,990 slabs; lb.....	585,741	13,770
Wire.....	9	2,563
Zinc, lb.....	882	97

The comparison for two years since January 1 is as follows:

	41 weeks of 1885, time 1884.	Same of 1886, time 1885.
Cutlery, pkgs.....	3,387	4,308
Hardware, pkgs.....	568	561
Iron, R. R., bars.....	2,110	9,020
Lead, pkgs.....	33,314	29,653
Steel, pkgs.....	1,729,127	1,410,988
Tin, shds.....	1,508,133	1,560,263
The slabs, lb.....	15,174,008	15,060,828

The British Mail Steamer Ireland.

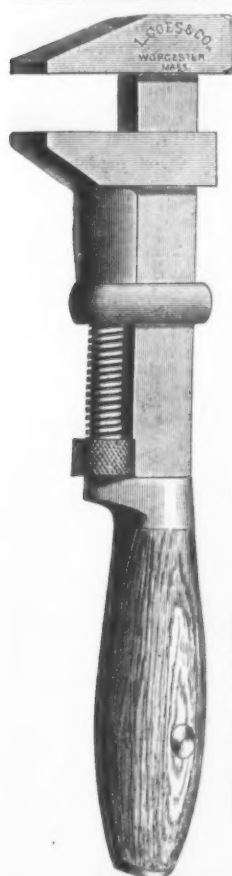
The British mail steamer Ireland, recently completed for the City of Dublin Steam Packet Company, has been the subject of extensive comment in English papers, special interest being attached to her because of the exceptionally high speed attained, and the size of her engines. The Ireland is a paddle boat, built by Messrs. Laird Bros., of Birkenhead, England, and during a recent trip in the course of regular work covered over 23 miles an hour—a performance unparalleled in rough-water steaming. The engines are oscillating, of the ordinary double piston rod, jet-condensing type. The cylinders are 8 feet 6 inches in diameter by 8 feet 6 inches stroke. The crank-pin is 24½ inches in diameter. The two piston-rods for each cylinder alone weigh 4 tons, and each piston weighs 8 tons, and is fitted with packing rings 13 inches deep. At 27 revolutions per minute this large mass of metal travels with a velocity of 459 feet per minute. The total strain on the piston, allowing 30 pounds as the initial steam pressure, and 13 pounds for vacuum, or 43 pounds total, is 351,353 pounds, or over 1½ tons. There are two slide-valves to each cylinder, each valve weighing 1½ tons. The paddle and intermediate shafts, with crank and crank-pins, weigh 47 tons. Each paddle-wheel weighs 55 tons. The engines, moreover, are remarkable for the fact that they have no bed plate. In order to get a long stroke in a shallow ship with a sharp rise of floor every inch had to be saved, and instead of a bed plate proper a heavy strip of wrought iron runs round and is secured to special engine frames and keelsons, so that the engines are virtually built into the ship as part of her structure.

G. S. Strong of Philadelphia, Pa., has patented a machine for welding circumferential seams in heavy iron tubes, such as are used in steam and water boilers and tanks. Two or more short tubes which are to be united have their ends formed so as to telescope, and are placed in a vertical position, one above another, upon a revolving table, to which the lowermost section is securely clamped. The lapped portions are then heated by a movable annular furnace. Two sets of welding rolls are employed, one of which is mounted upon a vertically moving head located inside of the tube, while the other is mounted upon a vertically moving annular head that surrounds the tube. Both sets are moved into a position opposite the seam, and are adjusted horizontally to be brought into contact therewith. The table is then set in motion to revolve the sections and to carry the seam between the rolls. The rolls are gradually adjusted into closer and closer proximity, in order to press and weld the lapped portions together and so to form a smooth seam.

Several meetings of the creditors of M. A. Richardson, No. 177 Lake street, Chicago, who failed on the 17th inst., were held during the past week, and it is believed that an arrangement will be effected by which Mr. Richardson will be enabled to continue business. His liabilities are said to be about \$60,000; assets not stated.

Messrs. Shields & Brown, Chicago, are putting their insulated air coverings on the steam-pipes of a number of large buildings, among which are the Grand Pacific Hotel, Chicago City Railway Shops, Presbyterian Hospital, Windsor Hotel, Chicago; Pullman Car Shops, Pullman, Ill., and the Kankakee Insane Asylum.

A leading importer of aniline dyes, who not long since retired from business, sends a long communication to the *American Journal of Fabrics*, in which he says the importing aniline houses of this country all resort to bribing dyers to use and recommend their goods, so that legitimate business is impossible.



L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches

MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.

ESTABLISHED IN 1839.

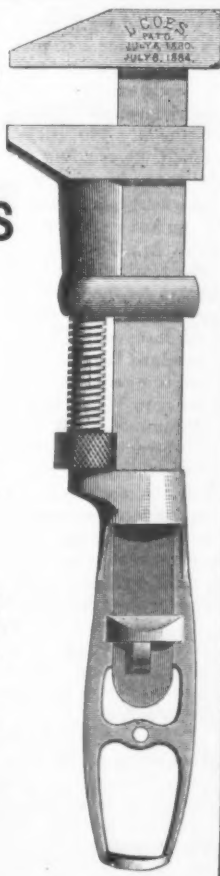
Patented July 6, 1880.  Patented July 8, 1884.

Registered March 31, 1874.

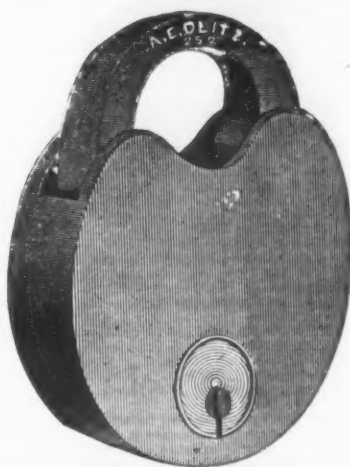
Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.
2 1/2" Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

DURRIE & McCARTY,
NEW YORK,
Sole Agents.

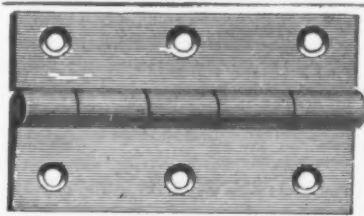


A. E. DEITZ.



DURRIE & McCARTY, Agents,

97 Chambers & 81 Reade Sts., New York.



W. & J. TIEBOUT,

MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY

HARDWARE.

Nos. 16 & 18 Chambers Street,
NEW YORK.



ALWAYS GIVES THE
UTMOST SATISFACTION.

Main Belting Co.,

Manufacturers of

THE LEVIATHAN

COTTON

BELTING.

Unsurpassed for

Strength, Durability and

Cheapness.

Made to any Length,

Width and Strength.

Main Driving Belts.

Guaranteed to Run

Straight, Even Through-

out.

No Cross Joints, Un-

affected by Damp.

Clings well to the Pulley,

Has no equal. In fact,

is THE BELT.

MAIN BELTING

COMPANY,

S. W. cor. Ninth and Reed

Sts., Philadelphia.

Also

248 East Randolph St.,

CHICAGO.



BRYANT'S PATENT

EGG BEATERS.

SIMPLE, PRACTICAL,

NOVEL.

Retails at 20 Cents Each.

Price, \$2.00 per doz. and dis.

ADDRESS MANUFACTURERS,

PAINE, DIEHL & CO.,

12 BANK STREET,

Philadelphia, Pa.

FROST'S PAT. THILL SPRING.



Every Pair Warranted
for One Year and
No Rattle.

Send for Circular to

STILES FROST,

276 Devonshire St., Boston, Mass.

THE REIHER IMPROVED

Self-Locking Transom Lifter

answers equally well for all

Transoms

Hinged at the top.

Hinged at the bottom.

Hinged at the center.

F. A. REIHER,

Manufacturer,

11 and 13 S. Canal St., Chicago.

JOHN H. GRAHAM & CO.,

Eastern Agents,

113 Chambers Street, New York

Send for catalogue.

Cut showing the parts belong-

ing to the transom lifter

A. The locking bar.

B. The self-locking adjusting

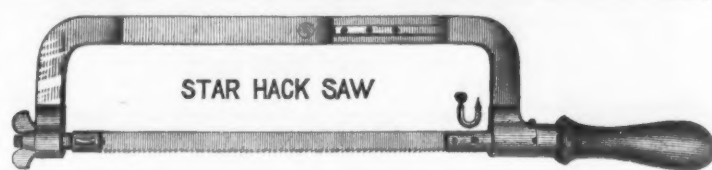
block.

C. The operating rod.

D. The lower bracket.

E. The lifting arm.

F. The transverse bracket.



STAR HACK SAW

These STAR HACK SAWS are the only thing in our list for which the demand is steadily and rapidly increasing in these dull times. Every dealer who orders them is sure to increase the number in his second order. They will be in universal demand, and every store in the land can sell them at a profit, besides giving great satisfaction to their customers.

There is no risk in handling them, as we will take back every one which is not wanted, whether bought of us or some other dealer. We guarantee them to do double as much cutting as any other kind in market.

Length of Blade,	6,	7,	8,	9,	10,	11,	12,	assorted, 6 to 9.
Price per dozen,	55,	60,	65,	70,	85,	95,	105,	65 cents.

STAR HACK ★ SAW FRAMES.

WITHOUT BLADES.

No. 0 extension frame, to hold 10, 11 and 12 inch, steel polished and nicked.....\$12.00
No. 1 extension frame, to hold 6, 7, 8 and 9 inch, steel polished and nicked..... 9.00
No. 2 solid frame, to hold 8 inch, steel polished and nicked..... 8.40
As seen in the cut, these frames are all made adjustable, so as to face the blades in four different directions. They also have the patent staple-shaped pins to hold the blades in the frames, which are so arranged that they cannot fall out.

MILLERS FALLS CO.,

No. 74 CHAMBERS ST., NEW YORK.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
WAREHOUSE
97 CHAMBERS AND 81 READE STREETS NEW YORK.
DURRIE & McCARTY, Sole Agents.

H. B. SEIDEL, President. W. HASTINGS, Vice-Pres. and Gen'l Mgr. E. T. CANBY, Sec. and Treas.

THE SEIDEL & HASTINGS CO.,

WILMINGTON, DELAWARE,

New York Office, No. 221 Pearl, Corner Platt Street,

MANUFACTURERS OF

**BEST CHARCOAL
BOILER PLATES,**
AND PLATE IRON GENERALLY.
ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 55,500 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.

VARIETY IRON WORKS.

ALFRED C. JERRE & CO.,
Manufacturers of
PATENTED HARDWARE SPECIALTIES AND NOVELTIES.

MAIN OFFICE AND FACTORY: 126 Chambers St., New York, Chas. E. Spier, Mgr.

BRANCH OFFICES: 415 Commerce St., Phila.

New Spring Specialties—King Egg Beaters, awarded medal at American Institute, New York; King Candle Lamp and Lantern, cheapest combination ever made.

STRONGEST ACME WRENCH AND BEST



ALL STEEL CASE-HARDENED JAWS. WARRANTED. MANUFACTURED BY
OWSLEY BROS. & MARBLE, 784 to 794 Madison St., CHICAGO, U. S. A.
Description and Price List Furnished upon Application.

NIMICK & BRITTAN MFG. CO.,
PITTSBURGH, PA.,

BUILDERS' FINE HARDWARE,

RIM AND MORTISE DOOR LOCKS WITH

BURGLAR-PROOF ATTACHMENT.

GENUINE BRONZE AND IMITATION BRONZE KNOBS, &c., &c.

Mathes' Patent Burglar-Proof Sash Locks.

PADLOCKS.

TEA, COUNTER, UNION AND PLATFORM SCALES.

Catalogues and Lists furnished on application.
JOHN H. GRAHAM & CO., Agents, 113 Chambers St., New York.

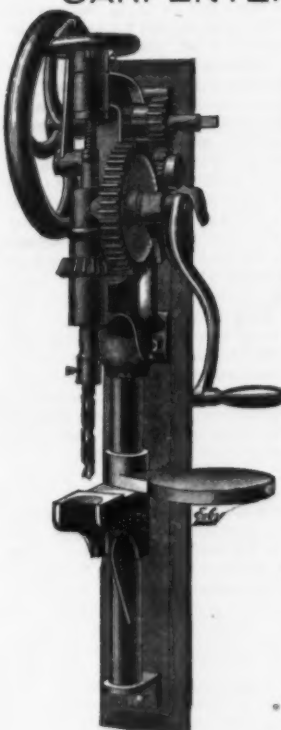
Illinois Iron and Bolt Co.

Nos. 20 to 26 Main Street,

CARPENTERSVILLE, KANE CO., ILL.,

MANUFACTURERS OF THE

BAILEY DRILL.



No. 4.

Possesses more points of merit than any other Drill on the market, among which are the following: The entire spindle and feed-screw are of Steel. The self-feed may be used or not, as desired, and can easily be changed to slow or fast feed. Table can be fastened at any desired point by an improved cam. Through an intermediate gear, balance wheel may easily be disconnected. Different speeds may be obtained by changing crank from one shaft to another. All parts are interchangeable, and every Drill is set in perfect line and tested before shipping.

ALSO OF

BLACKSMITHS' TOOLS,

Patent Steel Wagon Skeins,

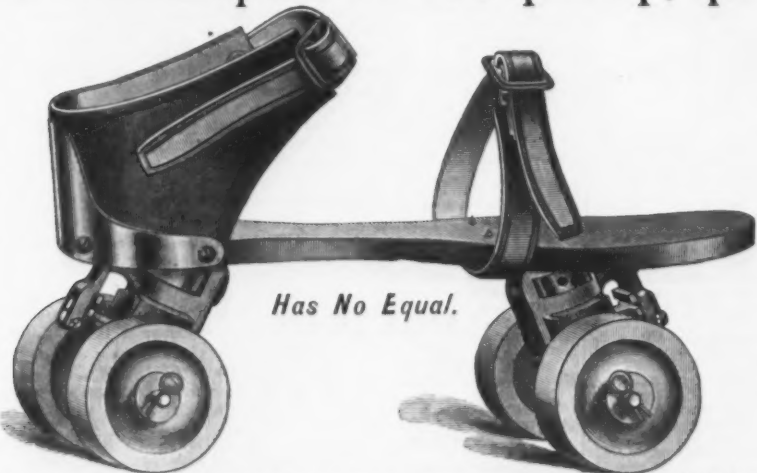
JACK SCREWS, TIRE BENDERS, TRACK JACKS,

Carriage Makers' Vises,

SAD IRONS,

COPYING PRESSES AND STANDS, &c.

The PHILADELPHIA NO. XX ROLLER SKATE



Has No Equal.

Showing Style of Phila. No. XX Rink Skate. Sizes running from 7 1/2 to 12 inches.

With this Skate it is possible to describe the smallest circle; do the fastest skating with greater ease than can be done upon any other skate upon the market.

AMERICAN MANUF'G. CO., Box 871, PHILADELPHIA.

(LLOYD & SUPPLEE HARDWARE CO., 625 Market Street, PHILADELPHIA.
For Sale by **DURRIE & McCARTY, 97 Chambers Street, NEW YORK.**
(LOCKWOOD, TAYLOR & CO., CLEVELAND, OHIO.)

PURE TURKISH EMERY.

WALPOLE EMERY MILLS,

South Walpole, Mass.

Power Companies in England.

The General Hydraulic Power Co., of London, were started three years ago with a capital of £100,000, fully subscribed, the whole of which has been expended in the laying down of some 12 miles of mains and in the erecting of three sets of engines, one of which at work alone, it is stated, pays expenses and leaves a good profit. The Hydraulic Co., like the gas and water companies, have a practical monopoly with extensive powers, in some cases compulsory, over the whole of London. The company's pumping station is at Bankside, and the works are on a large scale, the machinery employed being of the newest design. Water is drawn from the river direct and stored in large cisterns placed over the engine-room. Between the cisterns and the engines is a series of charcoal filters, of the Pulsometer Co.'s make, through which the water passes before being pumped into cylinders 23 feet high, having circular weight-cases weighing 100 tons each, working up and

means of revolving benders which act in conjunction with the revolving shear blades. Suitable feed mechanism for continuously feeding the wire to the cutting and bending devices is employed. The revolving cutters are backwardly and rearwardly inclined, so as to permit the forward movement of the wire past the cutter after the latter has severed the staple blank. As the cutting is practically instantaneous, no interruption is caused to the continuous advance of the wire by the movement of the movable cutters past the stationary one.

Display of Hardware.

A correspondent sends us a sketch of a case for displaying Hardware, the general arrangement of which is represented in the accompanying illustration. Part of the section of shelving, it will be seen, 6 feet long by 3½ feet wide, has been taken out, and the bottom, top and sides beveled as represented. This gives an attractive space for arranging samples of various kinds and

was laid. On this strong bottom is built the superstructure, the wickets and their heavy iron props, the lower ends of which fit into grooves in the foundation. When the wickets are lowered they lie flat on the surface of this "made" river bed. The navigable pass extends out in the river from the river wall of the dam a distance of 559 feet. Next come the three weirs, respectively 224 feet, 224 feet and 216 feet, extending over to a point near the lower end of Davis Island.

The wickets in the navigable pass and the weirs range from 9 feet 9½ inches to 13 feet in height, and are nearly 4 feet in width and 9 inches thick, made of oak. Just above the line of the wickets in the weirs there runs what is called a "service bridge," and above the dam and at the junction of the navigable pass and the respective weirs there are large stone piers built for the purpose of steadying this service bridge. This structure is composed of a framework of iron in sections of 8 feet, and it can be raised and lowered at will from the bed of the river by means of

ployed. They will raise the wickets one by one in the navigable pass by means of a hook-pole, line and winch. The wickets in the weirs will be raised by means of chains extending from the service bridge. An electric-light machine will be operated by water-power, furnishing sufficient radiance for expeditiously operating the lock after nightfall.

The dimensions of the dam are as follows: Lock chamber, 800 x 110 feet clear. Navigable pass sill (on river bed), 559 feet. Weir No. 1 (sill 1 foot above bed), 224 feet. Weir No. 2 (sill 2 feet above bed), 224 feet. Weir No. 3 (sill 3 feet above bed), 216 feet. Length of main channel, 1223 feet, and piers included, 1290 feet.

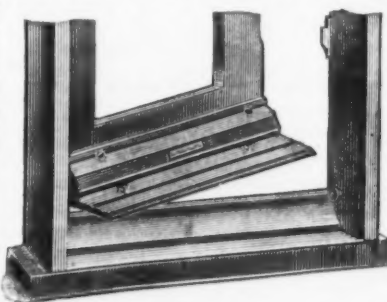
Number of wickets in navigable pass..... 130
Number in Weir No. 1..... 66
Number in Weir No. 2..... 66
Number in Weir No. 3..... 54
Total..... 305
In navigable pass each wicket is 12 feet 1½ inches long by 3 feet 7 inches wide.
In Weir No. 1 each wicket is 11 feet 1½ inches long by 3 feet 9 inches wide.
In Weir No. 2 each wicket is 10 feet 1½ inches long by 3 feet 9 inches wide.
In Weir No. 3 each wicket is 9 feet 1½ inches long by 3 feet 9 inches wide.
The wickets are spaced 4 feet apart between centers, leaving 3 inches clearance.
On the back channel is a permanent dam 456 feet long.

The dam was so far completed in the summer of 1884 that it was temporarily raised and continued up for five weeks with a satisfactory result. At the close of 1884 the total expenditures had been \$828,252.85, and it was expected that the total cost would be less than \$1,000,000. This includes gates, lock and shore works. The cost of the dam proper will be about \$750,000, or \$437 per foot lineal.

HARDWARE NOVELTIES.

The Perfection Weather Strip.

In the engraving below we show an automatic weather strip intended to prevent the entrance of currents of cold air under the outside doors of dwellings, and also to prevent the rain from driving up during the violent storms of summer. It is known as the Perfection Weather Strip, and is manufactured by the Richmond Weather Strip Co., of Richmond, Ind. The device is arranged in two sections, so connected that as the door is opened the strip is released from its confined position against the sill and is raised high enough to pass freely over the sill or the carpet that may be inside the room. On shutting the door the strip is forced down into position by coming into contact with the knob or stud shown in the right of the frame, near the floor. The strip is made in different kinds of finish, adapting it for use with all kinds of finish. Among the special qualities to which the manufacturers direct attention may be mentioned that it is constructed without springs, triggers or circular irons, and has a positive action. It is counterbalanced in such a way as to produce the results above named. A modified form of this device is made, adapted to be used on double doors. Both styles are so constructed as to be readily fitted in place by carpenters and mechanics in general.

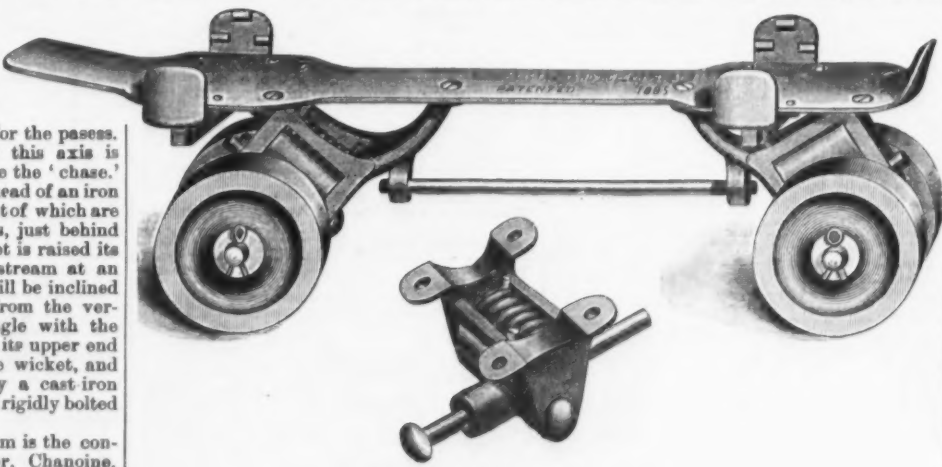


The Perfection Weather Strip.

The strip is adapted to the width of the door by cutting from the ends, for which purpose ample surplus wood is always allowed.

Hart's Standard Roller Skate.

The Upson & Hart Co., Unionville, Conn., are making the Skate named above and illustrated herewith. The main feature of this



Hart's Standard Roller Skate.

operate a chain drum with a reversible motion, and the gate is either run out across the lock or back into the recess, as it is closed or opened. In order to fill the lock when closed with water there are 14 valves or openings in the river and land walls. These are operated by hydraulic jacks receiving their power from the pressure of the water in the tanks above described. The lock can be filled with water in three minutes' time, and it will be possible to lock a towboat, with a full tow of 10 barges and two fuel flats, in 10 minutes' time at the outside, without breaking up the tow, as has to be done in the locks on the Monongahela River. This is rendered possible by reason of the fact that the lock is 600 feet long and wide enough to amply accommodate four towboats abreast. The wickets of the dam are to be lowered, and in their manipulation a maneuvering boat manned by four men will be em-

skate is described as the application of a perfect-acting spring in place of the rubber cushions used in other styles of skates. The spring in this skate is made, as represented in the small cut, in a coil and inclosed in the roller truck, and is referred to as giving a quick and strong, and at the same time satisfactory, action to the truck in either direction. The uniformity of the tension at all times is alluded to, as compared with the varying pressure of rubber, and it is claimed that these springs do not weaken or break, and do not need adjusting, and that in addition there are no tension springs or screws to work loose. It is also claimed that the spring will bring back the trucks into place quicker and truer than contrivances found in other skates, and is so durable that it will, in fact, outwear the skate. As regards the skate as a whole, the points are made that it is as light as is consistent with dura-

bility, and that it is especially adapted to stand hard usage.

A New Barrel Truck.

A new departure in barrel trucks is among the new goods offered this fall and illustrated herewith. It is manufactured by Samuel C. Tatum & Co., Cincinnati, Ohio, and is designated as Tatum's Improved Iron Barrel Truck. The view given shows the incline or runway on two sides of the truck up which the barrel is rolled on its chime, when it readily assumes an upright position, resting flat upon the surface of the truck, as indicated by the dotted lines. The inner flange of the truck is for the purpose of preventing the barrel slipping off. Owing to the manner in which the axles are mounted it is said that a heavily loaded barrel can easily be turned in any direction, and that at the same time there is no tendency in the truck to slip away from the barrel when being loaded, the inclines being provided with a spur or projec-



Tatum's Improved Iron Barrel Truck. (Patent Applied For.)

tion which presses upon the floor the moment the barrel strikes the incline. Among the advantages which are claimed for this contrivance are the small space required for its use, as it can be run behind a counter where a common two-wheel truck is frequently too wide for the aisle, and that it can also be used to hold sugar or flour barrels under the counter. Barrels with one head removed can, it is said, be readily trucked about without spilling the contents. It is made entirely of iron. The price f.o.b. at Cincinnati is \$1 each, with discounts to the trade in quantity. Cushman Brothers, 161 Duane street, New York, are agents in this city for the manufacturers.

Excelsior Cutting Nippers.

C. E. Jennings & Co., 60 Rensselaer street and 87 Chambers street, New York, are putting on the market, as sole agents, the Excelsior Cutting Nippers, the construction and appearance of which are illustrated in the accompanying cut. It is designated as No. 10, is 3 inches long and warranted to cut soft iron or brass wire up to and including No.



Excelsior Cutting Nippers.

14. It is sold with the warranty that if it breaks within three months from date of purchase a new one will be given. This convenient and ingenious tool is offered at a low price, and is expected to meet a want of the trade.

Gelatine Dynamite.—Mr. Alfred Nobel, the well-known inventor of dynamite and blasting gelatine, has improved upon those explosives by introducing what he terms "gelatine dynamite," which combines and gives effect to the powers and qualities of both. It has gone little further than the test stage as yet, but accounts of its use in mines, limestone and granite quarries, tunnels and collieries show that it has advantages; that it does the work of dynamite in places which cannot be well ventilated, and that it leaves so little of an offensive smell that miners can go in almost immediately, feel no bad effects, and get on with their work. If it can maintain this asserted excellence, then Mr. Nobel has added another to the advantages and benefits he has conferred upon the working miner. But that is not all. In what are called "fiery mines" explosives that emit flame are attended with great risk; but here gelatine dynamite claims to do the work in coal mines, to get coal well, and to go through the drift faults with speed, precision and safety. It may or may not stand the test of experience in coal mines, as well as or better than powder, whose action in explosion it somewhat resembles. Doubtless this will be rigorously tested by scientific and practical men, and if it stands the test better an additional protection to the lives of colliers will be available. Mr. Nobel claims to be able to make this gelatine dynamite to suit the mildest work, and also to meet the surroundings of the most difficult mining.

A new 2000 ton press—the most powerful yet made—for drawing a 24-inch cylinder from the copper disk, will shortly be added to the plant of an English firm, and will be used chiefly for producing 16 inch shell-cases for the War Department.

down their circumference. The engines are of the inverted compound surface condensing type. The pressure is supplied from the columns direct to the pipes now laid at a pressure of 700 pounds to the square inch. From here the water is conveyed to the various districts in exactly the same manner as the ordinary water or gas mains. The mains can be used for extinguishing fires, and this is an important factor in the utility of the system.

The charge for the power is stated to be less than that of the London water companies for the fluid. The Hydraulic Co. are enabled to keep down the cost owing to ordinary Thames water being used, subject only to the mechanical filtering already named. That progress is being made with this scheme is evident by comparative figures in February, 1884 and 1885; last year the customers were 20, with 53 engines at work; this February they were 74, with 161 engines; the contracts respectively were 34 and 95, and applications are stated to be coming in daily. But London work is not the only thing on which the company expect to be engaged. Encouraged by their metropolitan prospects, the directors are promoting provincial companies, and have already obtained acts of Parliament for the extension of the company's business to Liverpool and to Newport, in Wales.

The Birmingham Compressed Air Power Co. start in an even more pretentious way, with a capital of £300,000. The company are to supply users with air under a pressure of about 50 pounds per square inch, at an average rate of about 5d. per 1000 cubic feet, which is estimated to represent a saving to most users of the smaller steam engines of about 20 per cent., apart from the saving of all cost of boilers, with their repairs and water. One of the special inducements, however, for the support of the compressed-air project is that existing small steam engines will require no modification, and the exhaust will in most cases be useful for ventilation. The experience obtained in working compressed air through long distances in the St. Gothard Tunnel and in collieries would appear to show that there is no difficulty in carrying out successfully the engineering portion of the project. The company have been promised a wide support, and there seems no reason to anticipate failure. A successful issue seems, indeed, to be so far anticipated, that we find another company registered on the 22d of August under the title of The General Compressed Air Co., Limited, with a capital of £50,150. So much may be said in favor of systems like those noticed, by which the user of machinery will be enabled to obtain what power he requires, and at the precise time wanted, without any previous preparation on his part in getting up steam, that we cannot but hope the result of the practical experiments now being carried out will answer the expectations formed.

The Thorn Wire Hedge Co., of Chicago, Ill., have procured a patent for a staple-making machine which is adapted to operate upon wire in coils as well as upon short waste pieces. The machine is provided with a stationary shear blade and with one or more revolving shear blades for cutting the wire into the desired length. The staples are bent or formed over a stationary bender by

sizes of tools. Our correspondent refers to his having had it lined with black, red and white, but his experience is that the plain white is, on the whole, most desirable, the goods showing to better advantage. He alludes to this arrangement as saving a great deal of labor, obviating the necessity for handling of tools and keeping the stock in better shape than other methods of displaying them.

The Davis Island Dam at Pittsburgh.

This dam, which is located at Davis Island, on the Ohio, opposite Bellevue Station, on the Fort Wayne Railroad, some 5 miles below Pittsburgh, is constructed on the Chanoine or wicket system. It is so built that at low water the wickets are raised and boats pass the locks. At high water the wickets are lowered to the bed of the river and boats pass over the dam. The coalboat traffic on this river made such a system necessary.

From the speech of Judge Agnew, at the opening, and from other sources the following description and account of the work is taken: "The elements of a *barrage mobile* or movable dam are a wicket, a horse, a prop and devices for maneuvering them. The wicket is merely a strong rectangular shield or panel of variable dimensions, hinged to an axis placed at a height of one-third the length of the wicket from the bottom of the weir and of seven-twelfths for the passes. The part of the wicket below this axis is called the 'breach'; that above the 'chase.' To the same axis is hinged the head of an iron frame called the 'horse,' the feet of which are hinged to the floor of the pass, just behind the sill, so that when the wicket is raised its place will be inclined down stream at an angle of 20°, while the horse will be inclined upstream at an angle of 5° from the vertical. The prop makes an angle with the horizon of 37°. It is hinged at its upper end to the axis of oscillation of the wicket, and at the foot of it is supported by a cast-iron block called a 'hurter,' which is rigidly bolted to the dam."

The general idea of the system is the conception of a French engineer, Chanoine. The system has been in successful operation for more than 20 years on several streams in France. In the building of a dam on the Ohio River, however, many problems arose that had never presented themselves in France; nevertheless, the question was largely a matter of experience, with the weight of judgment largely in favor of its success. Captain Mahan, acting under the orders of Colonel Merrill, was placed in charge of the work. The first coffer-dam was 1138 feet long, 12 feet wide and 14 feet high, and upon its completion the land wall of the lock was built on a natural rock foundation. Next in order, the river wall of the lock was constructed, with a concrete foundation 15 feet below the sill of the dam. When the last stone in this great mass of masonry had been laid a coffer-dam was constructed for the navigable pass, laying bare the bed of the river for a distance of 600 feet. Then a foundation of broken stone and cement 13 feet deep and 42 feet wide, crossed by a network of stout oak timber,

Current Hardware Prices, October 14, 1885.

[illegible]

WHOLESALE METAL PRICES, October 14, 1885.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢; provided that no bar from shall pay a less rate of duty than 35¢. Sheet, 11-0¢ to 15-10¢. Band, Hoop and Scroll, 1¢ to 4-10¢. Railroad Bars weighing more than 25 lb per yard, 7-10¢ of 1¢ per lb.

Standard American Pig Iron.
Foundry No. 1 X..... 10.50 @ 18.50
Foundry No. 2 X..... 10.00 @ 18.50
Gray Forge..... 10.00 @ 18.50

No. 1 Scotch Pig Iron.
Carnbroe..... 10.50 @ 19.00
Coltines..... 10.50 @ 20.00
Shotts..... 10.50 @ 20.00
Glenarnock..... 10.50 @ 19.00
Langloan..... 10.50 @ 20.00
Summerlee..... 10.50 @ 19.50
Dalmellington..... 10.50 @ 19.00
Kilnblunnie..... 10.50 @ 18.00
Clyde..... 10.50 @ 19.00

Steel.
Steel at Eastern mills..... 10.50 @ 31.00
Old Rails, T..... 10.50 @ 17.50

Scrap.
Wrought, 10 ton, from yard..... 18.00 @ 18.50

Bar Iron from Store.

Common Iron:
1 to 6 in. round and square..... 1.6 @ 1.75

Refined Iron:
1 to 6 in. round and square..... 1.85 @ 2.35

1 to 6 in. x 3/4 to 1 in..... 1.9 @ 2.45

Rods—1/2 and 1-1/2 round and sq..... 1.7 @ 2.35

Bands—1 to 5-1/2 to No. 12..... 2.5 @ 2.55

'Burden's Best' Iron, base price..... 2.5 @ 2.55

Burden's 'H. B. & S.' Iron, base price..... 2.5 @ 2.55

Norway Nail Rods..... 2.5 @ 2.55

Sheet Iron from Store.

Common American..... 3.0 @ 3.45

Cleaned..... 3.0 @ 3.45

17 to 20..... 3.0 @ 3.45

21 to 24..... 3.0 @ 3.45

25 and 26..... 3.0 @ 3.45

27..... 3.0 @ 3.45

28..... 3.0 @ 3.45

29..... 3.0 @ 3.45

30..... 3.0 @ 3.45

Galvanized, 10 to 30..... 3.0 @ 3.45

Galvanized, 30 to 35..... 3.0 @ 3.45

Galvanized, 35 to 40..... 3.0 @ 3.45

Galvanized, 40 to 45..... 3.0 @ 3.45

American Russia..... 3.0 @ 3.45

Russia..... 3.0 @ 3.45

American Cold Rolled B. B..... 3.0 @ 3.45

Iron Wire.—(See Wire.)

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb, 2¢ per lb; valued above 7¢ and not above 10¢ per lb, 3¢ per lb; valued above 10¢ per lb, 3¢ per lb. Extra—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1¢ per lb in addition to above; Steel Circular Saw Plates, 1¢ per lb in addition to the above.

American Cast Steel.

For American Steel, see Pittsburgh quotations.

Chrome Steel.

Tool Steel, ordinary sizes, 1/2 to 1 1/2 inches, net..... 10 @ 14¢

Adamantine Shoes and Dies..... 8 @ 14¢

Magnet Steel..... 14 @ 14¢

English Steel.

Best Cast..... 10 @ 15¢

Extra Cast..... 10 @ 15¢

Circular Saw Plates..... 10 @ 15¢

Round Machinery, Cast..... 10 @ 15¢

Swaged, Cast..... 10 @ 15¢

Best Double Shear..... 10 @ 15¢

Blister, 1st quality..... 10 @ 15¢

German Steel, Best..... 10 @ 15¢

2d quality..... 10 @ 15¢

3d quality..... 10 @ 15¢

Sheet Cast Steel, 1st quality..... 10 @ 15¢

2d quality..... 10 @ 15¢

3d quality..... 10 @ 15¢

3d quality..... 10 @ 15¢

TIN.—Duty: Bars, Block and Pigs free.

1¢ per lb; Bars, Block and Pigs free.

Hansa..... 10 @ 22¢

Strata..... 10 @ 22¢

English..... 10 @ 22¢

Bar..... 10 @ 22¢

Charcoal Tin Plates.

1 C 10x14 225 sheets..... 7.25 @ 7.25

1 C 12x18 225 sheets..... 7.50 @ 7.50

1 C 20x28 112..... 10.50 @ 14.50

1 C 10x14 225 sheets..... 6.25 @ 9.25

1 C 12x18 225 sheets..... 6.25 @ 9.25

1 C 20x28 112..... 6.25 @ 9.25

1 C 10x14 225 sheets..... 6.25 @ 9.25

1 C 12x18 225 sheets..... 6.25 @ 9.25

1 C 20x28 112..... 6.25 @ 9.25

For each additional X add..... 1.25 @ 2.00

Coke Tin Plates.

Best..... 4.25 @ 4.65

Ordinary..... 4.25 @ 4.65

1 C 10x14 225 sheets..... 4.25 @ 4.65

1 C 12x18 225 sheets..... 4.25 @ 4.65

1 C 20x28 112 sheets..... 4.25 @ 4.65

For each additional X add..... 1.25 @ 2.00

Terne Plates.

Prime Char. 3d quality Coke..... 10 @ 14¢

1 C 10x14 225 sheets..... 10 @ 14¢

1 C 12x18 225 sheets..... 10 @ 14¢

1 C 20x28 112 sheets..... 10 @ 14¢

For each additional X add..... 1.25 @ 2.00

Tin Boiler Plates.

1 C 10x14 225 sheets for No. 7, 112 sheets..... @ \$12.00

1 C 12x18 225 sheets..... @ 13.00

1 C 20x28 112 sheets..... @ 15.00

COPPER.—Duty: 1¢ per lb. Bar and Ingot, 1¢ per lb. Old Copper, 1¢ per lb. Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad valorem.

Ingot, Lake..... 10 @ 11¢

Ingot, Baltimore..... 10 @ 11¢

Ingot, Anchor..... 10 @ 11¢

Braziers' Copper, ordinary sizes, 16 oz. sq. ft. and over..... 17 @ 17¢

Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz. sq. ft..... 18 @ 18¢

Braziers' Copper, 10 oz. and 12 oz. sq. ft..... 19 @ 19¢

Lighter than 10 oz. sq. ft..... 20 @ 20¢

Circles less than 84 in. diam..... 20 @ 20¢

84 in. diam. and over..... 20 @ 20¢

Segment and Pattern Sheets..... 20 @ 20¢

Locomotive Fire-Box Sheets..... 19 @ 19¢

Sheeting Copper, over 12 oz. sq. ft..... 16 @ 16¢

Bolt Copper..... 18 @ 18¢

Copper Bottoms..... 18 @ 18¢

Nickel-Plated Sheathing..... 35 @ 35¢

Plating extra..... for boilers

Flat Copper Boiler Bottoms or Fit Bottoms, cut to special sizes..... 21 @ 21¢

Tinning.

14x18, by the case..... 10 sheet, 5¢

4x18, less than case..... 8¢

For tinning both sides, double the above amount.

O'Neill's Patent Platinized Copper, Net..... 14x18

14 and 16 oz. and heavier 30¢ By the case, 10 @ 20¢

12 oz. and lighter..... 30¢

7 in., 14x36 8 in., 14x36 9 in., 14x36

14 and 16 oz. and heavier 30¢ By the case, 10 @ 20¢

(And all sizes not over 30 in. wide.)

24x48 and 30x60..... 20 @ 20¢

14 and 16 oz. and heavier..... 10 @ 10¢

12 oz..... 10 @ 10¢

Copper Wire.—(See Wire.)

Sheathing Metal.

Yellow Sheathing Metal, 10 @ 20¢

BRASS AND GERMAN SILVER.

Brown & Sharpe's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1884..... dis. 30 @ 30¢

LEAD.—Duty: Fig. 10¢ per 100 lb; Old Lead, 2¢ per 100 lb; Pipe and Sheet, 5¢ per lb.

American..... 4¢ @ 46¢

Bar..... 4¢ @ 5¢

Pipe..... 4¢ @ 5¢

Block Tin Pipe..... 40¢

Tin Lined Pipe..... 15¢ dis 20¢

Sheet..... 7¢ dis 20¢

Shot..... Drop, 6¢; Buck, 7¢

Chilled Shot..... 7¢

ANTIMONY.

Sheet..... 9¢ @ 95¢

Cookson..... 95¢ @ 105¢

SPELTER.—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.

American, cash..... 45¢ @ 55¢

Berger..... 95¢ @ 105¢

ZINC.—Duty: Pig or Block, \$1.50 per 100 lbs.

Sheet, 24¢ per lb.

600 lb cases..... 5.80 @ 6.00

Zinc—Open..... 6.50 @ 7¢

Zinc Tubing..... dis. 10 @ 20¢

Zinc Tubing—Dis. 25¢.

Plain..... 27

Fancy..... 28

Scotch and Extra Patterns..... 36

RABBIT METAL.

N. P. U..... 10¢ @ 10¢

X..... 10¢ @ 10¢

J. B..... 10¢ @ 10¢

WIRE.

Market Wire.—Put up in 63 lb bundles.

Nos. 00 to 9, 10, 11, 12, 13, 14, 15, 16, 17, 18.

10 11 11 1/4 12 1/4 14 15 16

Bright Market Wire..... dis. 70¢

Charcoal..... dis. 50¢

" Bale Wire, Nos. 7 to 12..... dis. 65¢

Annealed Market Wire..... dis. 70¢

" Fence Wire, Nos. 8 and 9..... dis. 70¢

" Grape Wire, Nos. 10 to 14..... dis. 65¢

Coppered Market Wire..... dis. 60¢

" Bale Wire, Nos. 7 to 12..... dis. 60¢

Galvanized Market Wire..... dis. 60¢

" Fence Wire..... dis. 60¢

Stone or Weaving Wire.

Nos..... 16 17 18 19 20 21 22 23 24 25 26

Cents..... 14 15 16 17 18 19 20 21 22 23 24

Nos..... 27 28 29 30 31 32 33 34 35 36

Cents..... 27 28 29 30 31 32 33 34 35 36

Nos. 16 to 18..... dis. 70 @ 70¢

19 to 26..... 70 @ 70¢

27 to 36..... 75 @ 75¢

Galvanized Stone..... 50¢

Steel Wire.

Cast Steel, Steel Wire list..... dis. 50¢

Brass and Copper Wire.

Old English Gauge the Standard—Dis 20 @ 30.

Common High Low Bronze and Copper.

All Nos. to No. 15, inclusive..... \$0.22 \$0.26 \$0.30

No. 17 and 18..... 23 27 31

" 19 and 20..... 24 28 32

" 21..... 25 29 33

" 22..... 26 30 34

" 23..... 27 31 35

" 24..... 28 32 36

" 25..... 29 33 37

" 26..... 30 34 38

" 27..... 31 35 39

" 28..... 32 36 40

" 29..... 33 37 41

" 30..... 34 38 42

" 31..... 35 39 43

" 32..... 36 40 44

" 33..... 37 41 45

" 34..... 38 42 46

" 35..... 39 43 47

" 36..... 40 44 48

" 37..... 41 45 49

" 38..... 42 46 50

" 39..... 43 47 51

" 40..... 44 48 52

" 41..... 45 49 53

" 42..... 46 50 54

" 43..... 47 51 55

" 44..... 48 52 56

" 45..... 49 53 57

" 46..... 50 54 58

" 47..... 51 55 59

" 48..... 52 56 60

" 49..... 53 57 61

" 50..... 54 58 62

" 51..... 55 59 63

" 52..... 56 60 64

" 53..... 57 61 65

" 54..... 58 62 66

" 55..... 59 63 67

" 56..... 60 64 68

" 57.....

INDUSTRIAL ITEMS.

MAINE.

Twenty-five tons weight of machinery for the manufacture of cement in Colorado will be supplied by Knowlton Bros., of Camden.

NEW HAMPSHIRE.

The S. C. Forsaith Machine Co., of Manchester, report their business as being much improved over last year. They are selling a large number of steam engines and boilers, also a large amount of iron and wood working machinery. This company probably carry the largest stock of new and second-hand machinery of any one concern in the country, and have a high reputation for fair dealing.

Application has lately been made to the Humphrey Machine Co., of Keene, for parties at Rochester, N. Y., engaged to furnish power for the new electric-light machinery there, to build 15 circumshot water-wheels, 42 inches in diameter, to run under 96 feet head and supply 200 horse-power each.

MASSACHUSETTS.

The Mason Machine Works, builders of improved cotton machinery of all kinds, at Taunton, are running their large shops on full time, but not to their full capacity, as they are at present giving employment to 650 hands, while 1000 hands can easily be worked in their shops. This company have one of the largest and finest plants for the manufacture of cotton machinery that there is in this country, and have had for many years a high reputation on their work. The company have several orders on hand, and report the business outlook quite encouraging.

For drop-forging of flyers, Benjamin Buckley's Sons have recently placed in their works at Paterson, N. J., a 200-pound Beaudry upright hammer, manufactured by Beaudry & Cunningham, Boston.

The directors of the New Process Twist Drill Co., Taunton, have elected Henry S. Hart president, and Edwin O. Williams agent and superintendent. The foundry and machine premises now owned by P. H. Carr have been leased for a term of years, and a new engine, boiler, shafting, steam-piping, forges and other machinery will be at once placed in the building, and drills will be ready for the market within a month.

PENNSYLVANIA.

The Manhattan Hardware Co., who formerly operated in New York under a charter from that State, have moved to Reading, surrendered their New York charter, and are now organized under the laws of Pennsylvania. They are erecting large works at Reading to accommodate their growing business, including foundry, 262 x 65 feet; machine shop, 242 x 36 feet; packing department, 36.2 x 24 feet; engine and boiler house, 50 x 24 feet; malleable-iron foundry, 150 x 45 feet; sheds, 200 x 25 feet; japan ovens, nickel-plating works and several other necessary buildings, and when all are completed, which is expected by February 1, will occupy 10 or more acres, which, of course, means yardroom, &c. The capital is \$100,000.

No. 2 Furnace of the Pennsylvania Steel Co., at Steelton, which up to October 2 has been in blast four years and two months, has in that time made 173,400 tons of pig iron.

The Whitaker Iron Co., of Wheeling, W. Va., are about to lease and put into operation the rolling mill of McKee, Anderson & Co., at Beaver Falls, which has been idle for nearly two years. Numerous improvements will be made.

The puddlers employed at the sheet mill of the Reading Iron Works are striking for an advance of 25 cents per ton. The mill is idle.

Sotter Bros., proprietors of the Mechanics' Boiler Works, Reading, have purchased a 25-light Edison incandescent electric-light plant for their establishment. The plant is to be erected next week, and the Sotter Bros. have the privilege to accept or reject if it does not work satisfactorily. This step was deemed necessary on the part of the Sotter Bros., because of the large amount of work which they have on hand requiring night-work to fill their orders promptly.

Clement B. Grubb, of Lancaster, who lately bought the Mount Hope Furnace, is tearing down the plant and moving it away.

No. 2 Furnace of the Thomas Iron Works, at Hokendauqua, is ready for lighting and will be blown in at once.

The Keystone Iron Works, Reading, resumed operations last week in all departments, and over 40 hands are employed. The works started up on orders. Several other orders are also on hand to be filled, and the outlook is bright and encouraging. Nearly all of the former employees are included in the present force. The works have been lying idle nearly two years. Eventually they will employ nearly 100 hands.

The Cambria Iron Works, at Johnstown, are just finishing the shipment of several large orders of street rails to various parts of the West and Southwest. The entire order amounted to 90 carloads. The orders were consigned to Lawrence, Kan., Kansas City, Atlanta, Austin, and Texarkana.

The Tyrone Foundry and Machine Works are working full time, and have a number of large orders ahead. Messrs. Austin Brothers, who have leased them, are pushing, energetic men.

The Ellis & Lessig Steel and Iron Co., of Pottstown, have put into operation what is claimed to be the largest steam whistle in the United States.

The Lickdale Iron Co., located near Lebanon, have about perfected arrangements for the manufacture of steel plate.

Owing to lack of orders the Union Foundry and Machine Co.'s Works, Catasauqua, were partially closed last week.

September was the busiest month the Glendon Iron Co., of Easton, have had this

year. During the four weeks ending Wednesday, September 30, they shipped between 10,000 and 15,000 tons. Forty carloads of iron left the works on Tuesday, September 29.

The new Babcock boilers at the Lochiel Furnace, Harrisburg, are in position. The furnace will soon be ready for blast.

The E. & G. Brooke Iron Co., of Birdsboro, have established the custom of donating to each tenant two months' rent—for November and December—thus charging but for 10 months. They also sell their workmen coal at cost.

The Fayette Furnace and Coke Works at Oliphant are said to be for sale. Several Eastern capitalists were on the ground last week examining the plant with a view of purchasing.

The nail factories of P. L. Kimberly & Co., in Sharon and New Castle, resumed operations last week on former scale of 21 cents per keg. These factories, with most of the other factories west of the Alleghenies, had been idle for the past four months on account of a strike of the operatives against a reduction to 17 cents per keg. These two factories contain 95 machines, 40 at Sharon and 55 at New Castle, and give employment directly to about 150 men and boys.

The two blast furnaces Nos. 1 and 2 of the Reading Iron Works are being repaired, and it is expected that they will soon be put in operation. Superintendent Francis Albert has a force of 16 men at work clearing up the place and cleaning out the furnaces.

Cofrode & Saylor, proprietors of the Philadelphia Bridge Works, have closed a large and important contract for the ironwork and interior castings of a large six-story building to be erected by the Girard Trust at the southwest corner of Eleventh and Market streets, Philadelphia. The building will front 160 feet on Market street and extend a depth of 180 feet, with a height of 90 feet. The entire front on Market and Eleventh streets will be of cast iron, requiring in all about 1500 tons of iron.

The Hollidaysburg Iron and Nail Co. have added 30 new men to their already large force of nailers.

PITTSBURGH AND VICINITY.

The window-glass factories on the Southside are preparing to start up for the season's work. Estep & Co., Twenty-second street; Ihmsen & Co., Fourteenth street, and Campbell & Co., Twenty-first street, will fire up this week. S. McKee & Co., Twelfth street, will also start. Howard & Co. will start up their works on Twenty-second street immediately if the present gas supply on the Southside is found to be sufficient. Otherwise they will have to wait until the pipe-line is laid across the river. Their furnace in their glass house at Twenty-first street will not be ready for natural gas for nearly two weeks, when they will probably fire up.

The Buster Mfg. Co. have purchased from the Pittsburgh and Western Railroad Co., through Mr. George Stewart, for \$18,000, a piece of land on Preble avenue, Allegheny, 200 feet wide and extending back to the Ohio River. The company intend to erect a building 100 feet wide facing on the river, and extending back 175 feet. They will use it as a foundry and finishing shop. They have promised to place \$75,000 worth of machinery and employ a large number of men. The company is composed of Pittsburgh, St. Louis and New Castle capitalists. Work will be commenced at once.

James Rees & Sons have contracted to build for the West Virginia Fire-Brick Co. a set of engines 16 inches in diameter, 7 feet stroke, with four 40-inch boilers, each 26 feet long. The boat for which the engines are being made is to do towing on the Upper Ohio, and is to be finished by December 1.

The Keystone Bridge Works are now working only about half-time, and are doubling up all of their employees, so as to give each an opportunity to earn something. They have plenty of orders to fill, but cannot get the iron and steel necessary to do so. They have been getting considerable from Carnegie Brothers. This firm are on in full blast in all departments, but still cannot keep the Keystone supplied.

OHIO.

Armstrong Bros., of Springfield, have just closed their contract with the Springfield Engine and Thresher Co. for their season's supply of boilers, 350 in number. They are running a full force of men 18 hours a day.

Among some of their recent shipments are two steel tubular boilers, for the Columbus Asylum for the Insane, 65 inches diameter and 18 feet long; three steel tubular boilers, 54 inches diameter, 16 feet long, for the Soldiers' and Sailors' Orphans' Home, at Xenia; one steel tubular boiler, 66 inches diameter, 16 feet long, for the Northern School building, Springfield; one 50-horse-power steel boiler, for Bretner's tannery, Springfield; three 20-horse-power and one 15-horse-power boiler, for St. Louis; two 50-horse-power boilers for the Art Museum, and one 40-horse-power for the Music Verein, Cincinnati. The contract for the four large steel boilers for the Cincinnati courthouse was awarded them last week.

The old works of the Novelty Iron Co., Cleveland, are being repaired and fitted up, preparatory to their being occupied by the Cleveland Tack Co. (Bishop & Babcock).

Eliza Furnace (coke), in the Hanging Rock Region, which has been out of blast for repairs, blew in again on October 6.

MICHIGAN.

The Elk Rapids Iron Co. inform us that the English shipment which they made recently, and to which reference was made in these columns, was of 400 tons charcoal pig, and was purchased by an English firm to be used for malleable castings. It was the same grade of iron which the Elk Rapids Iron Co. sell for the purpose named in this country, not being made especially for foreign shipment, and the price obtained was practically the usual price here.

MISSOURI.

The Mississippi Glass Co., St. Louis, are turning out from 4000 to 5000 feet of rough

plate glass a day, with orders coming in as fast as they can be disposed of. For cathedral glass the demand runs ahead of production.

The St. Louis Vise and Tool Co. are now working six days per week and report business very good.

The Globe File Works, of St. Louis, have sufficient orders booked to keep them busy for the next three months.

The Granite Iron Rolling Mills of the St. Louis Stamping Co. continue to run three turns a day.

ILLINOIS.

The Ajax Forge Co., of Chicago, are getting out a number of switches for the Chicago, Burlington and Northern Railroad, and the ironwork for trestles on the same road. The company have just commenced the ironwork for an ore dock at Ashland, Wis., in which 1100 tons of iron and steel will be used.

The Ellithorpe Air Brake Co.'s works, Chicago, are very busy. Among recently booked orders may be mentioned one hydraulic passenger elevator for W. M. McNair, Minneapolis, Minn.; one for Lee's Hotel, Minneapolis; one for Sol Smith Russell's new store, Minneapolis; two for Messrs. Lowry & Herrick, same place, and one for the German-American Bank, St. Paul, Minn. The company are just finishing up some work for the Palmer House, Chicago, and are also shipping two hydraulic passenger elevators to the Iowa State Capitol, Des Moines.

According to the Joliet News the Joliet Steel Co. now roll steel rails in two-rail lengths, thus saving two crop-ends on every two rails, as well as securing a larger product than by the old method of rolling single rails. The company intend to roll four-rail lengths after a while.

Ground has been broken at Grand Crossing for a very large factory for the manufacture of metallic coffins. The Illinois Central Railroad are putting in side tracks, and other facilities are being acquired.

The working force of the Western Electric Co., Chicago, has again been increased. The electric-light department in particular is doing a brisk business. The company are placing a general lighting plant at Bucyrus, Ohio, and are booking many orders for cables and multiple switches.

MARYLAND.

The Cumberland Iron Mills of the Baltimore and Ohio Railroad Co. are to be started. Structural and merchant iron will be made for the market, and it is expected that the mills will be in full operation within three months.

VIRGINIA.

The Virginia Nail and Iron Works, in Lynchburg, have suspended their puddle and plate mills for a week or ten days to put in a new and heavier shaft preparatory to their contemplated increase of nail machines to nearly double their present capacity, made necessary by the steadily rapid increase of demand for their nails. The nail factory and bar mill will continue upon full time.

The Longdale Iron Co. are building a railway from Sewell Station, on the Chesapeake and Ohio Railway, up Mann's Creek, to a large body of coal lands they have recently purchased on the headwaters of that stream. Those lands are underlaid by the noted Nuttall bed of New River, or No. XII, semi-bituminous coking coal, which will be mined to supply the coke ovens of this company at Sewell.

GEORGIA.

The Atlanta Bridge Works, formerly run by Wilkins, Post & Co., are to be reorganized as a joint-stock company. Under the plan adopted, the creditors will take stock to the amount of their claims, and the new company will issue \$300,000 in bonds, secured by mortgage upon the property, which bonds will be used to pay off preferred creditors. All the bonds have been taken and all the creditors have agreed to take their proportion of the stock. The company have secured several contracts and the works will be started shortly.

ALABAMA.

Briarfield Furnace, which has been out of blast for nearly two years, is being changed from charcoal to coke.

The Gadsden Iron Co. have succeeded to all the property and business of the Coosa Furnace Co., owning the Coosa charcoal furnace, at Gadsden. Mr. A. J. Crawford has been elected president of the new company.

A. H. Howland and associates, of Boston, Mass., have contracted to construct water works, embracing 200 fire-plugs, at Montgomery, and supply the city with deep-well water for 15 years, at \$11,000 a year.

The contemplated extension of the Montgomery Southern Railroad has been defeated by a suit to vacate the sale of the 20 miles already in operation to Farley, Spear & Co., of Montgomery, who proposed to build the rest.

The White Star Towing Co. have been organized at Mobile, mainly to bring coal down the Warrior River.

An important opinion was filed by Justice Bradley in the United States Circuit Court at Trenton, N. J., on the 12th inst., in the case of the United States vs. Warwick & Co., glass manufacturers, of Gloucester County, in which the question of the issuing as currency paper known as "shin-plasters" in payment of wages is involved. The defendants, together with the various other manufacturers of South Jersey, had been in the habit of paying their employees with this sort of paper, and stores for the sale of provisions were opened at which it was made redeemable. The workmen at last demurred to the system, because the money would not be taken except at the stores conducted in the interest of the bosses. The labor organizations then petitioned the State Legislature for a law abolishing the system and were successful. Then Congress passed a law requiring those issuing the money to pay the Govern-

ment a tax of 10 per cent. on the whole amount put in circulation. District-Attorney Keady then sued Warwick & Co. for the tax on \$67,000 worth of shin-plasters. It was shown at the trial that less than \$4000 worth were issued, but the notes were re-deemed and reissued from time to time till the aggregate amounted to \$67,000. The trial court directed the jury to find for only the original amount issued. The district-Attorney took out a writ of error, which was sustained by Justice Bradley. He holds that the jury should have found, if at all, for the tax on \$67,000, and that a note redeemed is not a note at all, and a reissue is of the same force and effect as an issue of new notes. A new trial is ordered, and the revival of the much-vexed question will again cause excitement among the "shin-plaster" men and the labor organizations.

A New Method for Estimating Carbon in Iron.

The following method has been for some time in use at Terrenoire: A weight of 1 gram of the sample, or less, according to the amount of carbon present, is digested in a tabulated retort with a solution of 5 grams of sulphate of copper in 30 or 40 c. cm. of water at a gentle heat until the whole of the iron is dissolved. The solution, when cleared from suspended matter, is drawn off by a siphon, care being taken that none of the solid residue is disturbed. About 30 or 35 c. cm. of pure concentrated sulphuric acid are then added, and, after cooling, 4 or 5 grams of pure crystallized chromic acid. The carbonic acid formed by the oxidizing action of the chromic acid on the separated carbon is determined by absorption, not as is commonly done in caustic potash, but in neutral carbonate of potash, which absorbs a second equivalent of carbonic acid, producing bicarbonate of the same base. The absorption apparatus consists of a series of V-tubes, each containing exactly 1 c. cm. of a standard solution, which, when saturated, represents 0.0005 of carbon. This solution is made by dissolving 4.65 grams of carbonate of potash in 1 liter of water. To indicate the point of saturation, manganate of potash is added to the solution (25 mg. per 60 c. cm.), which is changed into permanganate by carbonic acid, and colors the solution red as soon as the whole of the alkaline carbonate is converted into bicarbonate. As each tube corresponds to a constant weight of carbon, the total number of those discolored by the operation will give the quantity of carbon to within 0.0005 or 0.05 per cent. without further calculation or weighing.

In conducting the operation the retort is at first heated until the contents are brought to a state of brisk ebullition, after which the heat is moderated or increased according to the rate of evolution of the gas. The current is maintained by an aspirator so regulated as to prevent absorption taking place in more than one tube at a time, dry air free from carbonic acid being introduced through the tubulure of the retort. In order to determine the exact composition of the potash solution an experiment may be made from time to time with a compound of known carbon contents. Pure crystallized carbonate of soda is convenient for the purpose (0.0441 gram carbonate of soda, containing 0.005 carbon). As regards accuracy the following tests (A) have been made in comparison with Boussingault's method (B):

	(A)	(B)
Steel.....	0.25	0.20
Martin steel.....	0.435	0.38
Watch-spring.....	0.325	0.29
Watch-spring.....	0.525	0.50
Ingot iron.....	6.295	6.273
Cast steel.....	0.62	0.63
Cast iron.....	1.615	1.63

This method of determining carbon is considered to be preferable in many respects to those now in use. Only a single weighing is required, no time is lost in the tedious operation of filtering and washing precipitates, and no calculation is required. One chemist with a single assistant may complete 14 determinations in a day.

The Coal Tonnage of English Railroads.

In the early history of railways the mineral traffic was not taken into consideration, although it now forms more than three-fifths of the total merchandise carried. It is now exactly 40 years since coal was first sent to London by railway, for in the year 1845 the London and Birmingham Railway carried 8337 tons within the area of the city dues, the coal on the first train being covered with tarpauling, as the officials were by no means proud of that description of traffic. In 40 years the London traffic has increased from 8337 tons to close upon 7,000,000 tons, the total last year having been 6,836,616 tons. Once the value of the railways for the conveyance of coal was recognized, prejudice gave way to advantage, and the traffic rapidly increased. During the last few years, however, the quantity of coal put on the leading lines has grown immensely. In 1874 the quantity put on to the various lines was 66,642,550 tons, while in 1884 it had grown to 97,581,904 tons, which was less by nearly 2,000,000 tons than what it was in 1883. The revenue, therefore, that is derived from the carriage of coal by several of the leading lines must be something enormous. Indeed, the best paying line in the Kingdom, the Taff Vale, is now solely a mineral railway, and the Hull and Barnsley promises to become a similar one. The Midland appears to have made good progress during the last ten years, for, while the quantity put on to it in 1874 was 9,615,186 tons, last year it was 14,846,550 tons. In the same period the Taff Vale doubled its traffic, carrying 4,352,778 tons in 1874 and 8,864,838 tons in 1884. The coal traffic, it may also be said, is a very fair indicator of the general state of the trade of the country. The depression which prevailed last year caused a falling off in the tonnage of coal that was put on to most of the lines as compared with 1883, which was a better year all round. At one time it may be said most of the lines ran rather wide of several of the most important coal fields, but the

early mistakes made in that direction have long since been rectified, and nearly every coal field and large colliery has railway accommodation. The following figures show the tonnage of coal put on to the various lines of railway in 1883 and 1884, and will bear out the remarks we have made with respect to the coal traffic being a good indicator of the state of trade:

	Tons.	Tons.
	1883.	1884.
Furness.....	1,390,355	1,041,086
Great Northern.....	4,611,821	4,583,896
Great Western.....	11,190,728	11,417,269
Lancashire and Yorkshire.....	6,585,773	6,610,104
London and North Western.....	12,566,794	12,470,222
Manchester and Sheffield.....	6,439,024	6,469,800
Maryport and Carlisle.....	293,896	293,782
Midland.....	15,592,620	14,846,550
North Staffordshire.....	14,216,395	12,963,140
North Tyneside.....	1,446,878	1,398,100
Taff Vale.....	8,614,715	8,864,838
Caledonian.....	7,676,490	7,685,114
Glasgow and South Western.....	2,319,369	2,298,679
North British.....	7,032,670	6,847,095
Totals.....	90,688,487	97,571,904

Foreign Markets.

FRANCE.

PARIS, September 30, 1885.—Metals.—To-morrow, fortunately, the elections are to come off; while they were pending but little business was done, and prices lower for all but Spelter. After the elections business in Metals may move along more briskly once more. We quote to-day's market as follows: 100 kg.: Copper.—Chili Bars, 107.50 @ 110; Ingots and Slabs, 111.25; Best Selected, 116.25, and Pure Corocoro Ore, 110; Tin.—Banco, 247.50; Billiton, 245; Straits, 246.25; Australian, 246.25, and English, 246.25. Lead.—28.50 @ 29.50, and Spelter, 88 @ 89. Iron.—The Valenciennes report dated yesterday, reads about as follows: "For a great number of years past France has not passed through an iron crisis so long and so intense as the one we are traversing at present. For some time the turn up to attenuate its severity. Even the commonly surest and most effective means has been applied to conjure it latterly, that of a rigorous reduction of output, but it has miserably failed; not only has it failed in standing prices, but the prices are now lower than when the remedy of curtailment was applied. Prices are now down to 12.30 @ 13 francs @ 100 kg. for Merchant, without provoking much of a demand. The latter barely suffices to keep a few rolling mills going. The Sarthe report of yesterday reads less gloomy than the one preceding. It says: "Rolling mills and foundries receive a tolerable amount of orders, so as to keep them half busy. At low prices there is no lack of demand for goods for the winter season. Merchant sells at 14 @ 15 francs for Coke, and 15 @ 16 for Mixed."—*Moniteur des Interests Matières.*

BELGIUM.

BRUSSELS, September 30, 1885.—Iron.—Prices remain the reverse of firm, yet no actual further decline has been submitted to. At Charleroi some fresh orders for finished iron have dropped in. Steel works are on the whole better provided with orders than iron works, and the prices they get, at any rate, have a greater margin of profit than the latter are able to realize. The better news from England some three weeks ago caused a revival of confidence among us, but they are again flatter there, nor has the situation in France and Germany improved in the least so far. We are therefore, as heretofore, surrounded by countries no better off than we are ourselves. In the meantime the fall reason draws to its close without bringing the amount of new work we had all hoped for. Belgian makers have availed themselves of the lull in order to form fresh connections abroad, especially in Serbia, and with the latter country quite successfully so. Now, however, the unsettled state of political affairs in the Balkan Peninsula again interferes with the headway we had made in that direction. A Belgian-Serbian office for the execution of iron, &c., orders had just been opened at Belgrade, with a branch office at Ghent. M. Chaudrier, of Verriers had bought the Copper mines at Maidan-Pek, and Belgian capitalists had secured the Taurin coal mines. Gas works were to be built with Belgian money at Belgrade, &c. Common Pig is selling at 4 @ 4.40 francs @ 100 kg., at Charleroi, and Foundry at 4.75; Merchant Iron and Bessemer at 10 francs; Angles at 11.30, and Sheets at 13.35 @ 19. Coal is looking up.—*Moniteur Industriel.*

GERMANY.

HAMBURG, September 30, 1885.—Iron.—Steps continue to be taken to arrive at some understanding among all Iron and Steel producers between Sarrebruck and Dortmund, and after the Wire-Rod makers' meeting at Dortmund and the Ironmasters of the Sarre and Moselle have met at Sarrelrueck. They propose to modify what the Dortmund meeting proposed, to make the tax to be mutually paid 25 marks @ ton, 30 marks to be paid by each works as a tax for excess of output beyond the amount assigned it, while those remaining below the amount allowed them are to receive 15 marks, and that the convention be considered operative so soon as 85 % of the production shall have acceded to the rule. In order to arrive at an agreement somewhat on this basis, all German Iron works are soon to be represented at a general meeting to convene at Berlin. Meanwhile the Iron markets in Germany have remained flat and even weak. Last week, on the occasion of an adjudication which came off for Axles, the Dusseldorf-Oberbilk Steel Works carried the day at 330 marks @ Axle. The necessity of arriving at some understanding as to a general curtailment of production is becoming every day more pressing, so that it is hoped that the exchange of views to be made at the Berlin general meeting may lead to some practical understanding of the kind sure to last till a revival takes place sufficiently sound to do away with the reduction. Metals.—Copper has been weaker, all other metals steady.—*Borsenhalle.*

DORTMUND, September 28, 1885.—Iron.—On the 19th inst. a meeting of Rhenish-Westphalian Wire-Rod makers came off in this city for the purpose of forming a combination. The ensuing firms were represented: The Mendon Schweiher Iron Works, Boecker Co., Schalke; Finke, Hogen & Co., Langendree; Finke & Elbert, Hagen; the Hoechst Iron and Steel Works, of this city; the Westphalian Wire Works, of Hamm; the Steinhilber Wire Works, Bismarck; the Westphalian Iron, Hamm, and Witte & Kaemper, of Osnabruck. The following rules have been laid down for the proposed reduction of output: The production allotted to each works is to be the average output during any consecutive six months from January 1, 1884, to July 1, 1885. The combined works are to pay 2 marks @ ton into a common fund, whether the goods be sold or consumed by the works themselves, and the amount paid in is distributed pro rata among producers, less 10 % retained for the combination. Upon the basis of this agreement those producing in the future less than the amount they averaged during the period named will be indemnified out of the common fund, whereas a works putting on the market or using more of its own manufacture than it is entitled to pays the fine of 2 marks @ ton to those turning out less than they are entitled to.—*Borsenhalle.*

HOLLAND.

ROTTERDAM, September 29, 1885.—Tin.—The market has been quiet, declining about the middle of the week between 1/4 and 1 guilder, with a slightly improved tendency toward the close. We quote Banca, spot, 55.25 guilders @ 50 kg., and from the next sale 55; Billiton, spot, 54.25, and December delivery, 54.50. At Amsterdam Tin has been dealt in to a limited extent only, prices tending downward in the meantime. They quote Banca from the next sale, 54.50; Billiton, to arrive, 54 @ 54 1/2, with 1/4 guilder less offering.—*Koch & Vierboom.*

AUSTRIA.

VIENNA, September 26, 1885.—Iron.—There has been little or no change, but in the Vorarlberg combination has induced the Iron makers to underbid the latter. In Hungary White Pig sells at a little lower price than the previous week, say at 46 florins @ ton, but these low prices do not prevent stocks from increasing. Several owners of blast furnaces are resolved to curtail production if things do not mend soon. It may, however, last some time before they can make up their minds to such a measure. The demand for finished has been slightly better than during the summer, but prices are very much depressed. The market closes steady. White Pig at 47 @ 48; Gray do at 52 @ 54; Bessemer we quote 54 @ 56; Styrian Merchant, 130 @ 125; Bismarck, 100 @ 105; Sheets for locksmiths, 100 @ 120; for roofing, 100 @ 123; for boilers, 160 @ 155, and for tanks, 170 @ 175, and Bessemer, 105 @ 110 @ ton. Plumbago has been discovered in large amounts in Transylvania.—*Austrian Trade Journal.*

Exports.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the Port of New York, for the week ending October 13, 1885:

Dutch West Indies.	Quan.	Val.	Cutlery, cs.	5	345
Mf. iron, pkgs.	2	38	Mach'y, cs.	21	902
Hamburg.			Saws, cs.	5	896
Hdw., pkgs.	78	2,127	Chucks, cs.	2	69
Mach'y, pkgs.	6	2,475	Scales, cs.	7	187
Clocks, pkgs.	22	1,778	Ag. imp. pkgs.	21	183
Pistols, case.	1	240	Spikes, kegs.	2	100
Cutlery, cs.	5	199	Boilers, cs.	5	7,490
Nails, case.	1	40	Spikes, kegs.	287	747
Sew. ma. cs.	769	14,470	Iron, pkgs.	501	960
Saws, bxs.	58	182	Tinfol, cs.	15	285
Ag. imp. pkgs.	3	51	Copper tubes,	cs.	14
Amsterdam.			Mf. iron, pkgs.	273	5,888
Scales, cs.	12	261	Pumps, pkgs.	4	387
Hdw., case.	1	68	Nails, kegs.	203	505
Bremen.			Tinware, cs.	2	34
Mf. iron, pkgs.	34	554	M. dust, bbls.	10	14
Mach'y, pkgs.	12	1,798	Nails, cs.	14	165
Hdw., cs.	2	137	S. copper, case.	1	4
Cutlery, case.	1	10	L. pipe, casks	3	250
Steel, bars.	2	9	Marseilles.		
Ag. imp. pkgs.	1	55	Saws, case.	1	75
Bergen.			Hdw., pkgs.	44	657
Mach'y, pkgs.	30	1,609	Mf. iron, pkgs.	413	4,379
Liverpool.			Tinware, cs.	3	22
Copper, casks	31	3,155	Iron, bars.	100	57
Pig iron, tons.	118	2,825	Spikes, kegs.	10	30
Hdw., pkgs.	152	3,459	Rivets, bxs.	15	32
Mach'y, pkgs.	35	4,671	Scales, cs.	7	172
Clocks, bxs.	469	11,671	Nails, kegs.	5	71
Iron rolls, bxs.	40	1,200	Ag. imp. pkgs.	1	60
Gun, bxs.	38	658	Mach'y, pkgs.	7	316
Pumps, pkgs.	4	353	Sew. ma. cs.	30	925
Cutlery, cs.	9	490	Scales, cs.	4	67
Ag. imp. pkgs.	34	708	Steel, bars.	12	104
Copper matte,	bags	15,580	Pumps, pkgs.	8	76
Sew. ma. cs.	307	5,759	Saw teeth, box	1	100
Brass goods,	case.	1	Iron tank.	1	122
Saws, cs.	6	41	Iron safe.	1	124
Antwerp.			Tacks, cs.	2	12
Mf. iron, pkgs.	12	146	Anchors.	7	12
Sew. ma. cs.	49	785	Cutlery, cs.	4	286
Aras, cs.	3	81	Br. goods, case	1	29
Copper, cs.	234	30,510	Clocks, case.	1	20
Hdw., cs.	19	356	Tin plate, bxs.	2	30
Wire, rolls.	8	679	Haere.		
Skates, case.	1	418	Mach'y, pkgs.	10	1,500
Copper, casks	748	11,750	Ag. imp. pkgs.	1	58
London.			Hdw., case.	1	26
Mach'y, pkgs.	28	8,739	Copper mat'l,	sacks	1024
Sew. ma. cs.	166	6,962	Copper, casks	1071	5,000
Hdw., pkgs.	163	8,943	M. thread, cs.	11	4,429
Cartridges, cs.	8	136	Pumps, pkgs.	6	457
Rifles, cs.	2	105	Venice.		
Wire, bbl.	1	100	Clocks, cs.	10	957
Br. goods, case.	1	68	Uruguay.		
Saws, bxs.	33	112	Nails, pkgs.	25	735
Iron safe.	9	100	Ag. imp. pkgs.	18	355
Ag. imp. pkgs.	11	502	Washing ma.	28	185
Ox. zinc, bbls.	60	846	Mf. iron, pkgs.	25	474
Air guns, case.	1	107	Locks, pkgs.	101	3,235
Revolvers, case.	1	12	Scales, cs.	15	169
Mf. iron, pkgs.	33	199	Cutlery, pkgs.	99	679
Clocks, pkgs.	84	1,784	Hdw., pkgs.	99	2,071
Rotterdam.			Saw iron, prs.	900	230
Mach'y, pkgs.	3	325	Sew. ma. cs.	111	1,716
Copper, bars.	1831	7,765	Smyrna.		
Copper, casks	18	2,350	Pumps, pkgs.	7	375
Hdw., cs.	91	598	Haiti.		
Hull.			Cutlery, case.	1	22
Scales, cs.	350	8,972	Hdw., cs.	9	151
Hdw., cs.	5	424	Iron safe.	1	60
Ag. imp. pkgs.	5	312	Nails, kegs.	60	283
Pumps, pkgs.	5	301	Tacks, bxs.	5	29
Mf. iron, pkgs.	5	50	Scales, case.	1	8
Br. goods, case.	2	50	Mf. iron, pkgs.	1	10
Firearms, case.	1	72	Genoa.		
Clocks, pkgs.	39	994	Iron tanks.	2	300
Mach'y, pkgs.	4	1,133	Mf. iron, pkgs.	3	34
Glasgow.			Ag. imp. pkgs.	12	250
Air guns, case.	1	500	Hdw., cs.	10	230
Mach'y, pkgs.	18	460	Tinware, cs.	10	230
Mf. iron, pkgs.	23	328	Mexico.		
Sew. ma. cs.	12	3,383	Ag. imp. pkgs.	29	668
Guns, case.	1	21	Brass gds., cs.	3	52
Nova Scotia.			Mf. iron, pkgs.	195	960
Hdw., cs.	11	352	Mach'y, pkgs.	9	1,034
Clocks, cs.	4	106	Tinware, cs.	4	44
Mf. iron, pkgs.	17	316	Nails, kegs.	29	111
Iron doors.	2	800	Clocks, cs.	5	35
Sew. ma. cs.	2	175	Metals, cs.	5	236
Cartridges, cs.	9	37	Scales, case.	1	16
Saws, case.	1	50	Hdw., cs.	21	267
Newfoundland.			Shoe nails, cs.	2	12
Hdw., case.	1	27	Wire gds., pgs.	1	18
Mf. iron, pkgs.	2	100	Car wheels,	8	195
Pumps, pkgs.	1	30	Pumps, pkgs.	6	89
British Australia.			Sew. ma. cs.	10	320
Hdw., pkgs.	559	9,221	Pirass.		
Sew. ma. cs.	54	390	Pumps, pkgs.	2	86
Ag. imp. pkgs.	16	435	United States of		
Wringers, cs.	16	235	Colombia.		
Nails, cs.	16	162	Hdw., cs.	348	5,331
Tacks, cs.	9	30	Mf. iron, pkgs.	484	3,771
Sew. ma. cs.	109	3,818	Mach'y, pkgs.	67	2,334
Mf. iron, pkgs.	117	1,247	Saws, cs.	7	379
Scales, cs.	12	77	Cartridges cs.	19	332
Nails, kegs.	151	331	W. boat sup.	17	800
Saws, cs.	3	93	plies, pkgs.	80	802
Clocks, cs.	23	504	Iron safe.	4	392
Cutlery, pkgs.	88	953	Pumps, pkgs.	1	17
Pumps, pkgs.	3	125	Anchors.	2	18
Mach'y, pkgs.	1	135	Firearms, cs.	7	571
British Honduras.			Copper stills,	2	560
Cutlery, cs.	5	80	S. in, needles,	cases	5
Mf. iron, pkgs.	2	36	Steel, bbls.	10	165
Tinware, case	1	121	Rib. mtl, pkgs.	6	58
Sew. ma. cs.	6	33	Revolvers, cs.	3	156
Hdw., pkgs.	5	23	Lead pipe, csk	1	42
Scales, case.	2	39	B. metal, pkgs.	30	95
New Brunswick.			Nails, cs.	67	684
Steel rails.	648	6,100	Shoe tips, case	1	48
Spikes, kegs.	100	3,300	Cutlery, cs.	87	4,034
British West Indies.			Sew. ma. cs.	85	1,632
Mf. iron, pkgs.	41	228	Clocks, cs.	14	219
Nails, kegs.	39	183	Scales, cs.	30	425
Lead, pkgs.	2	101	Mf. iron, pkgs.	308	6,948
Scales, cs.	8	37	Wheels on ax.	12	272
Sew. ma. cs.	18	307	Nails, kegs.	175	470
Yol mtl, cs.	7	365	Ag. imp. pkgs.	16	330
Cutlery, cs.	2	53	Shot, cs.	100	9,086
Hdw., pkgs.	34	640	Y. metal, cs.	9	427
Clocks, case.	1	40	Lead, rolls.	30	341
Tinware, cs.	12	101	Brass gds., cs.	30	341
Ag. imp. pkgs.	3	84	Q. oil, flasks.	13	471
British Guiana.			Africa.		
Hdw., cs.	27	120	Nails, kegs.	5	16
Tinware, cs.	9	71	Sew. ma. cs.	6	44
Steam traps.	3	190	Mf. iron, pkgs.	6	97
Ag. imp. pkgs.	16	151	Brazil.		
Forges, pkgs.	3	60	Scales, cs.	9	350
British Possessions			Hdw., cs.	136	1,282
in Africa.			Mach'y, pkgs.	1	80
Hdw., cs.	5	115	Nails, kegs.	30	180
Pumps, pkgs.	4	207	Iron, cs.	110	465
C. wheels, prs.	16	352	Tacks, cs.	4	20
Cuba.			China.		
Mach. pkgs.	1,187	39,546	Mf. iron, pkgs.	5	106
W. cloth, case.	1	50			
Hdw., pkgs.	112	1,515			
Tacks, cs.	8	202			

A rolling machine for making tubes and other cylindrical articles out of cylindrical piles of bar iron has been patented by C. Kellogg, of Buffalo, N. Y. The mandrels generally used for rolling tubes consist of small rolls operating upon the inside of the cylindrical pile or ingot. But these rolls are not adapted for operation upon bar iron, inasmuch as the slag and scale which are knocked off from the iron interfere with the action of the rolls. The inventor employs a solid stationary mandrel composed of as many parts of equal size diametrically as there are sets of rolls in the mill. Each

of the parts is attached to a rod, so as to be held between or in the pass of the rolls in such a position that at the pass of the work the mandrel and mill-rolls act upon, consolidate and roll the ingot pile or tube simultaneously and at points of the exterior and interior surface directly opposite each other.

It seems probable now that a railroad will be built soon from Gadsden to the East Tennessee, Virginia and Georgia Railroad, at Jacksonville, and direct connection completed, in some way not yet definitely announced, between the latter place and Atlanta. The line to Jacksonville would be practically an extension of the Tennessee and Coosa River road, on which, in the other direction from Gadsden—that is, toward the Tennessee, at Guntersville—work is progressing steadily.

Our correspondent in Birmingham, writes: Phelps, Dodge & Co., of New York, had a man in Randolph County, Ala., last week investigating tin deposits, in which the seem to have had an idea of investing, but they did not buy. It is announced that the necessary machinery has been procured and other arrangements made to put the Broken Arrow tin mines in operation on a considerable scale very soon.

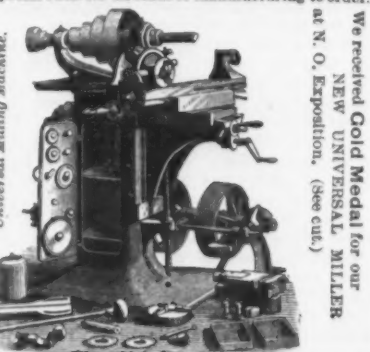
There is a movement on foot, mainly in the interest of the vast coal properties in West Alabama, to hold a convention in Tuscaloosa, representing that place, Birmingham and Mobile, and arrange to have forcibly presented to Congress the importance of improving the Warrior River.

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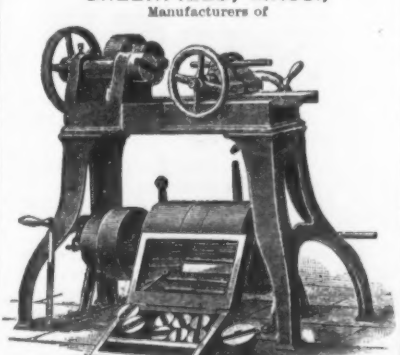
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MECHANICAL.

Marble Molding and Countersinking Machine.

An improved form of machine, built by Messrs. Riehle Brothers, of Philadelphia, and designed for cutting moldings and bevelling various kinds, and for countersinking surfaces in marble, is shown in the annexed cut.

The machine is automatic in all its movements, readily adjusted and controlled, and will perform the work of from six to eight men in countersinking washstand tops, besides leaving a much cleaner and smoother surface for polishing. It will be observed that by the arrangement of the slides cross-feed is secured in either direction, and by an extra rotary movement is added, useful in beveling holes of washstand tops to any form desired. By the three levers shown in front of the machine the different feed movements are thrown in and out of gear, and by skill-

ther, not only how to increase the boiler power by obtaining a larger grate area than the 16 or 18 square feet to which it is now ordinarily limited, and a corresponding heating surface, but also how to obtain the necessary adhesion of the wheels to the rails, since this limits the tractive force obtainable, and to be met, I think, only by providing means for an independent and variable adhesion, separate from the weight of the engine itself.

The demand in any case is still for greater steaming capacity in the boiler to enable the engine to either make time with heavier loads or increase the speed. To accomplish this two methods suggest themselves as being probably practicable. Since the boiler shells are limited in practice, for strength, to 54 or 56 inches in diameter, while the length is determined by the greatest available length of the tubes, which do not usually exceed 12 feet or 12 feet 6 inches, these considerations have thus far limited the extent of heating surface in the boiler. But this is not the main difficulty. The fire-box, located be-

There is one other way in which the efficiency, and consequently the power and speed can be increased, namely, by a more scientific and less careless method of burning the fuel. The well-known and established principles that air should be admitted to the hot gases coming from the fuel in proper quantities to form carbonic-acid gas, and that it should be admitted in fine streams, seem to be ignored in the locomotive. An excess or a deficiency of the required quantity of air to produce this result causes loss. The first, by the passage through the furnace of a large body of air, 80 per cent. of which is nitrogen and worthless in combustion. It absorbs heat without assisting in the burning of the gases, and, being heated to the temperature of the furnace gases, is then thrown away. Too small a supply of air produces the more easily-formed carbonic oxide, instead of carbonic-acid gas, and develops but one-half the available heat. Furthermore, unless the fire upon the grate is very thin, in passing up through the incandescent coal carbonic-

ture, and is borne out by common observation. It is impossible to take up the reports of any of the engineers of British boiler insurance companies without becoming aware that the majority of English stationary engines can lay no claim whatever to peculiar excellence. Mr. J. F. Bramwell, in his inaugural address to the British Institution of Civil Engineers, delivered early in the year, referring to this fact, said: "You will be astonished to hear that in an investigation instituted last year by the Corporation of Birmingham, when considering whether they should approve of a proposal to lay down power distributing mains throughout their streets, it was found on indicating some six non-condensing steam engines taken indiscriminately from among users of power, and ranging from 5 nominal horse-power up to 30 nominal horse-power, that the consumption in one instance was as high as 27.5 pounds, while it never fell below 9.6 pounds, and the average of the whole was as much as 18.1 pounds per indicated horse-power per hour." Evidently there is ample room for improvement.

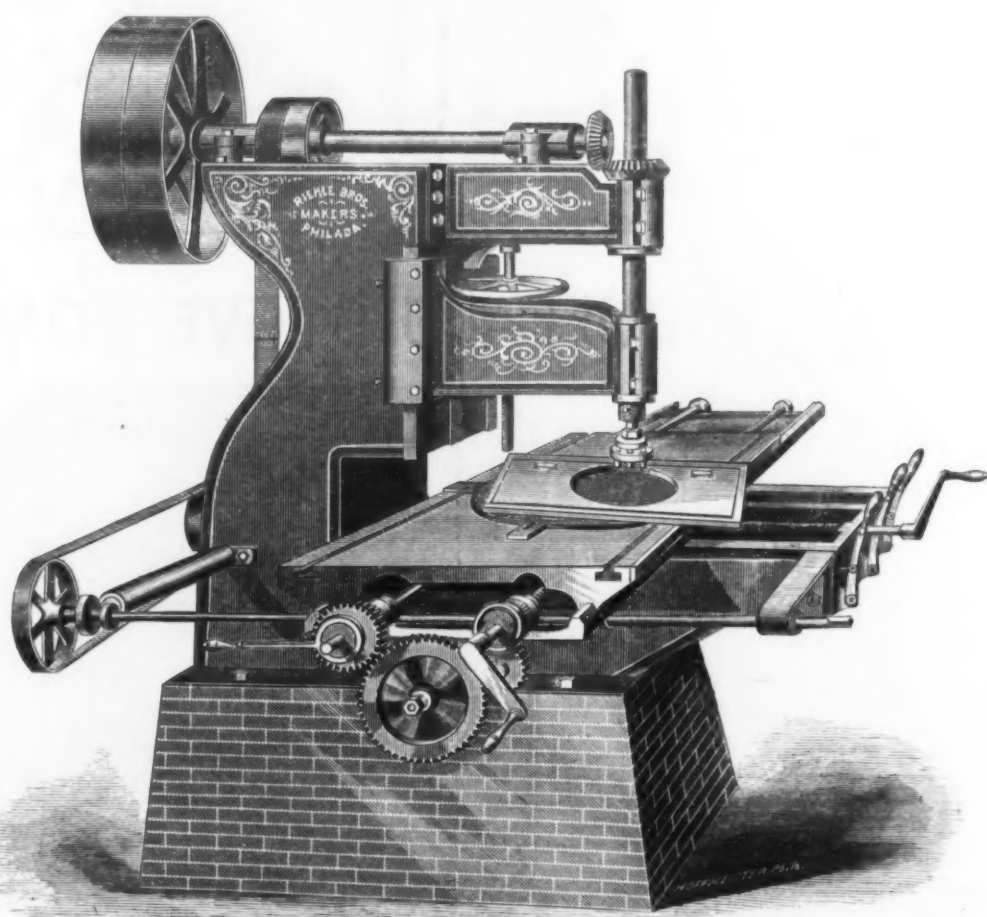
Ashton's Power Meter.

From a recent issue of the Manchester (Eng.) *Mechanical World* we reproduce the accompanying engravings of a new power meter invented by Mr. William Ashton, and exhibited at the International Inventions Exhibition, at London. It is based on a principle differing from that of all previous forms of integrating meters which depended for their motion and recording efficiency on the uncertain frictional contact of two

when C is at its neutral position, there can be no motion imparted by F to E in either direction, and the roller C is at its neutral position when the indicator piston, and, therefore, the engine piston, is under an equal pressure on both sides, no work, of course, being then done. It is easy to see that, if the roller C is carried above or below the point at which we show it in our engraving, it will cause the hyperboloid to turn through a greater or less angle at each single stroke, and this will disturb the relations of E and F and cause E to turn in one way or the other. Under continuous work E turns in one constant direction, because, as the frame carries the cone in one direction, the roller C is, say, above neutral point, and when the cone slides back C is, of course, below the neutral point, and so the mutual proportions of F and E cause continuous rotation of E to take place. Both the cone and the roller C are fluted so as to avoid slip—the cone vertically and the roller C circumferentially. The index, which is made to show the work done, is driven from E by the shaft I. The great beauty of this mechanism, and the ingenuity of thought and design, are strikingly manifest in the proportioning of the gearing F and E in their relation to the position of the roller C upon the hyperboloid.

The axis of the conoid is inclined so as to allow the face upon which C works to be in such a position as to cause as little motion as possible in the crosshead D.

The illustrations were taken from the first machine, and, though modifications have



MARBLE MOLDING AND COUNTERSINKING MACHINE, BUILT BY MESSRS. RIEHLÉ BROS., PHILADELPHIA, PA.

ful handling of the combinations a number of motions can be obtained. The use of the crank permits of hand adjustment when power is off. The upper bracket carrying the driving-shaft and gearing is stationary, while the lower, carrying the cutter-head and spindle, is adjusted to the proper depth of cut by the hand-wheel and screw.

The cutter-head carries six steel knives, which are ground to suit the shape of molding required. A round cutter is used for countersinking and dropping faucet elevations. These cutters cut in a horizontal plane, and will bevel edges and countersink surfaces, but a later attachment, not shown in the illustration, will cut in a vertical plane, and will panel slabs at any point away from the edges, and will also turn the corners nicely. The edges cut smooth, with no flaws.

The machine is neat, substantial and well made, and will do all that is claimed for it. Twenty-eight slabs of Italian marble, 20 x 30 inches, have been countersunk in 10 hours, and on an average 20 can be maintained. This machine requires but little power to operate it, as the revolutions of the cutters are comparatively slow. It runs quietly and smoothly, making but little noise, no dust and requiring no water. The table is long enough to support the longest piece of marble that will be likely to be required, such as hotel wash-basins with a number of holes.

Locomotive Grate Surface as a Factor in Rapid Transit.

Referring to the above subject Mr. Francis E. Galloupe, of Boston, in a recent letter writes as follows:

The present locomotive is a practical result only. Very little theory has been applied in determining its present construction and condition. It has resulted in nearly every detail from a compromise between two opposing conditions, each of which it would be desirable to carry to a further extent if it were not for its limiting effect upon the other.

While suggestions relating to the improvement and perfecting of the locomotive, such as slab frames or other methods of obtaining the requisite space for the enlargement of the grate area, the Forney type of wheel arrangement, the Joy link motion, independent valves for steam distribution and the extended smoke box, are all to be most heartily commended if practical use can demonstrate their successful and superior working, there are two prime elements in the problem of rapid transit of the first consideration, viz.: safety and increase of power. For the former it is beyond question that the present plan does not admit of the common practice of high speeds, such as 75 or 100 miles per hour, upon the ordinary surface roads. Into the reasons for this it is not the present purpose to inquire. For the latter, as the resistances increase as the square of the speed, and at high rates that of the atmosphere becomes augmented, so as to exceed all the other ordinary resistances, the question of power to meet them becomes an important one. The difficulty arising is, fur-

tween the wheels and the frames, practically limits the extent of the grate, except in the Wooten form, to about 20 square feet area. The fires have thus to be forced to an extraordinary degree, the rate of combustion frequently being 120 to 140 pounds of coal per square foot of grate per hour, as compared with 8 to 15 ordinarily in stationary boiler practice. This causes an enormous waste of fuel, which is shown in the low evaporative efficiency of our engines, averaging not more than 5 to 6 pounds of water to a pound of coal consumed, while good stationary boilers show 9 to 10 pounds. That this loss may be entirely prevented upon locomotives is shown by English practice, where, with an average speed of 50 miles per hour, a train weight of 213 tons used but 28 pounds of coal per mile run, with an evaporation of 9.88 pounds of water per pound of coal and a consumption of 2.05 pounds per indicated horse-power per hour. Upon our railroads, with a speed of about 35 miles and train weight of 350 tons, the evaporation is not more than 6 to 7 pounds and the consumption of coal said to be 4½ pounds per indicated horse-power per hour. The most obvious relief seems to be an extension of the grate surface in order to obtain more economical conditions for the burning of the amount of coal required in the given time. By using slab frames 1½ inches in thickness by 8 or 10 inches in depth, instead of the usual bar frames, or by modifying the customary design of the frames and the fire-box, so as to allow the latter to extend over the frames to within an inch or so of the driving-wheels, it would enable the grate surface to be increased by some 3 or 4 square feet. The length of fire-box is now limited by the distance between the main and back pairs of driving-wheels or the rigid wheel-base of the engine, which it is not considered desirable to increase much further. But its length is more particularly limited by the distance the fireman can easily throw the coal so as to keep the grate well covered and avoid bare spaces for the admission of currents of cold air. This limit for bituminous coal burners is about 6 feet. If slab frames are used, it then becomes necessary also to underhang the springs and equalizing beams beneath the frame and fire-box ring, which is objectionable on account of bringing them so near the track. It is very evident that the grate surface of engines will have to be increased at no distant day, and it would seem as though inventive genius might profitably be employed in studying practicable means for either introducing a separate furnace constructed in the tender, or where there is sufficient room to obtain the requisite grate area, thence conducting the burning gases beneath the boiler and through the tubes, or to extend the fire-box the entire length of the boiler and devise means for automatically feeding the fuel along the grate. The latter method has the objection of increasing the height of the boiler above the rail, and thus raising the position of the center of gravity of the engine and diminishing its stability, while the former seems to present less inherent practical difficulties.

acid gas, even though first formed, will, if the air supply is insufficient, take from the incandescent carbon an equivalent of carbon and pass off as carbonic oxide or unconsumed carbon.

It is practicable by artificial means, and yet with thoroughly simple apparatus, to so adjust these chemical relations as to greatly increase the efficiency of the furnace. The principle is that known as secondary combustion. The depth of coal may be increased upon the present grate area and burned with a concentration of heat by means of forcing the required air through the fire and the use of superheated steam. In effect it is to make a more combustible gas in the furnace than that now obtained, diluted as it is with the nitrogen of the air, and then to burn this gas as a secondary process in a combustion chamber, which may be entirely distinct from that of the furnace. Thus, smoke will be prevented in its formation, not caught or remedied at the wrong end, as in the so-called spark arresters and extended smoke-box methods, and superior economy and power rendered practicable.

Deterioration of English Steam Engines.

The decline in value of the English steam engine, as shown by comparison with foreign specimens at the Antwerp Exhibition, has drawn out from the London *Engineer* some comments, both timely and appropriate. They are equally applicable in other lines of manufacture, and deserve close attention. The way in which mischief accrues readily admits of illustration, which our contemporary supplies as follows:

"Messrs. Crosshead, Bolt & Co. build up for themselves in the course of years a nice and remunerative business as tool-makers, let us say. One of the firms was brought up in the shops of Sir Joseph Whitworth & Co. The firm was fortunate enough to secure the services as leading draftsmen of a gentleman of very extended experience in more than one tool-making establishment. Under these conditions very excellent tools are turned out, and a capital foreign connection is got together. By and by, however, it is found that profits are not quite what they were expected to be, and it is tacitly agreed to cut things down all round. The leading draftsman gets his dismissal. His place is filled by a cheaper man. Less care is taken to finish things well. The weight and scantling of framing are reduced. The various bearings and rubbing surfaces are diminished, and in this way cheap tools are produced, and the foreign market gets flooded with them. For a time all goes well. Then the German, the Belgian or the Frenchman appears on the scene. He produces a much better article for a very little more money, and Messrs. Crosshead, Bolt & Co. wake up some morning to find that their connection has practically disappeared. If they had kept their eyes open to what the foreign tool-makers were doing, if they had believed the statements made by their representatives abroad, all would have been well. As it is, all is ill." This is no fancy pic-

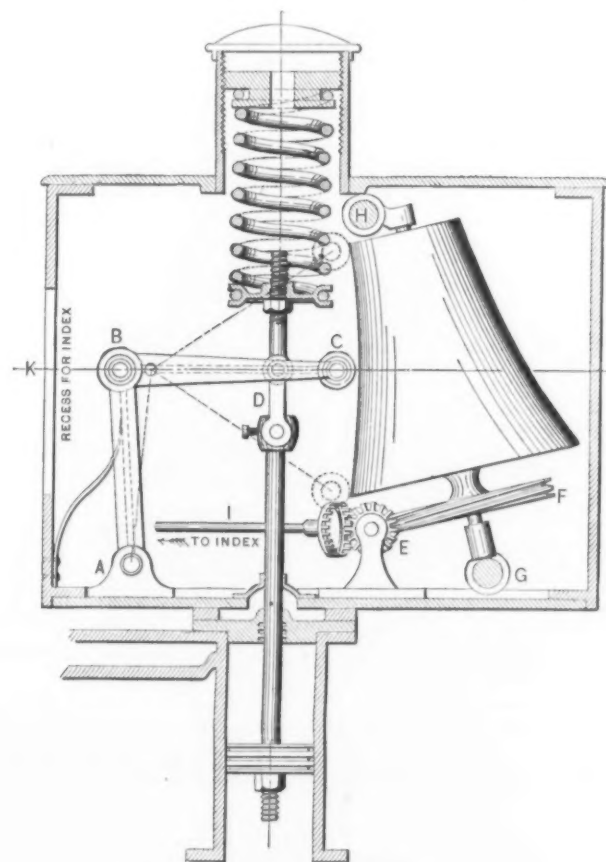


Fig. 1.—Vertical Section and Elevation.

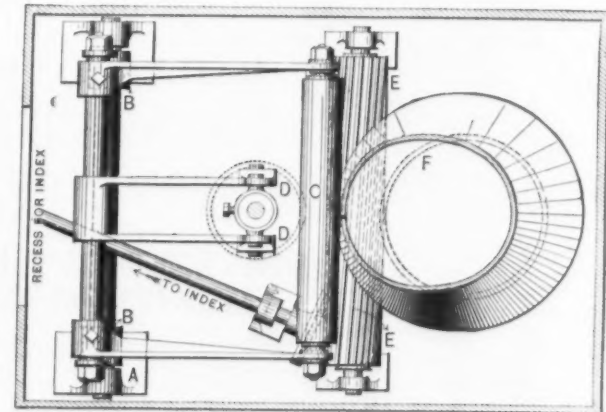


Fig. 2.—Top View.

A NEW POWER METER SHOWN AT THE INVENTIONS EXHIBITION, LONDON.

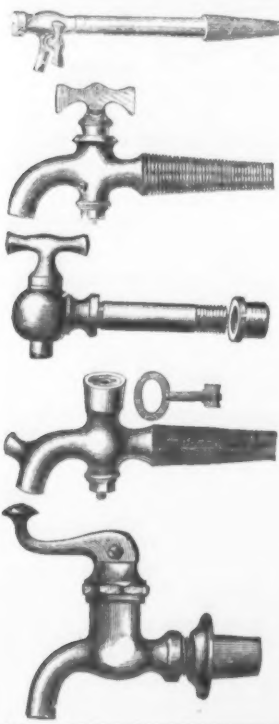
smooth rubbing surfaces. In the present instrument a positive action is given to the integrating apparatus. The meter consists of the following parts: A steam cylinder, the ends of which communicate with each end of the engine cylinder respectively. To the piston rod of this cylinder is attached the spring, which is a common feature, of course, of the two previous meters. By means of the crosshead D the motion of the piston is communicated to the roller C, which is pivoted at the ends of the arms B; these joint at B with the vertical links A, pivoted at their base A. A light curved lock spring keeps the roller C in steady contact with the hyperboloidal frustum M. This frustum is carried in a frame sliding to and fro upon the horizontal bars G, and a uniform length of stroke is given to this frame by means of rods or other mechanism driven from the engine. The hyperboloid, being free to turn on its nearly vertical spindle, necessarily revolves as it is drawn back and forth along the face of the roller C. Upon the spindle of the hyperboloid is a narrow worm, F, which, of course, revolves with it. This worm F gears with the long pinion E, the teeth of which have a skew or twist, as seen plainly in plan. It is thus evident that, if the worm F is drawn along without rotating, it will cause the twisted wheel E to turn through a small angle.

And here comes one point of the invention, the pitch of the worm F bears just such relation to the skew of the wheel E that, as the hyperboloid rolls round in contact with and upon C as a base line

since been introduced, there is no alteration whatever in the principle. The chief difference in the meter as now made by Messrs. Scott & Co., of Newcastle-on-Tyne, England, and the original trial machine, which we illustrate, is in the position of the spring, which is below the other mechanism.

A process of treating pig metal in the reduction of the crude pig to the blooms out of which the wrought metal is formed has been patented by W. Price, of McKeesport, Pa. The metal is first melted in the blast or reverberatory furnace, and before commencing the heat a certain portion of the cinder and coke is placed in the hearth of the refinery and melted under the blast. The molten crude metal is then conducted to the refinery and a suitable amount of coke is fed thereto. The melted metal is then subjected to the action of the blast and heated cinder, all the impurities being taken up by the cinder and carried off by the flame. As soon as the metal comes to nature, on checking the blast slightly the cinder floats at the surface thereof, and the operator taps the cinder from the metal. He then taps the refined metal and leads it either into the forge or knocking fire or to the puddling furnace.

Andrew Carnegie has presented the workmen at the Keystone Bridge Works, of which establishment he is a large stockholder, a library building worth \$25,000 or \$30,000, and \$1000 in cash for the purchase of books.



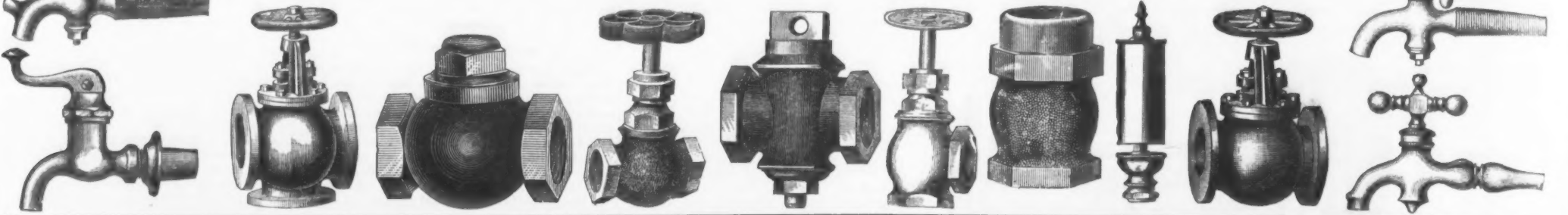
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It more than answers my expectations. I regret I did not buy one years ago. They are bound to come into general use in this country.
J. W. ALLISON, Liverpool, England.
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Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper, Tin and Lead Ores.

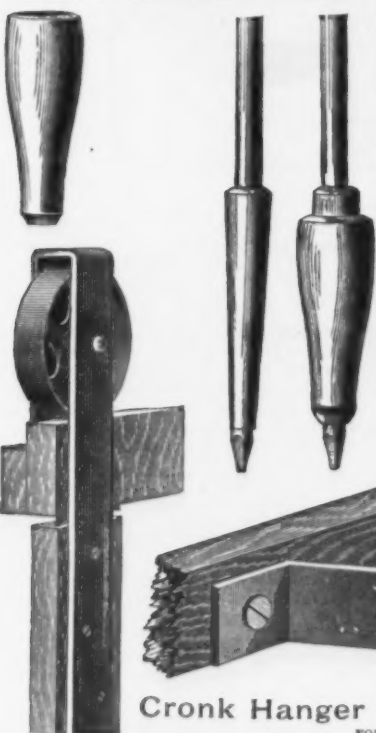
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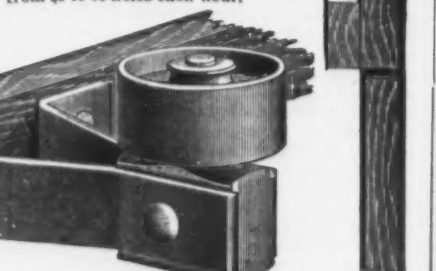
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OFFICE OF THE UNION NEWS CO., NEW YORK.

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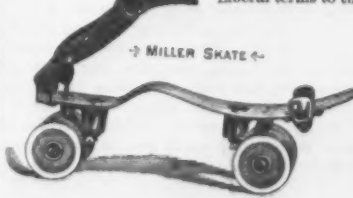
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SOLE MANUFACTURERS,

WEST TROY, N. Y.

The Miller Champion Roller Skate, manufactured by the James P. Smyers Roller Skate Co. Hamilton, Ohio. The only successful Steel Coil Spring Skate in existence. A great saving to Rink Managers. The most Scientific Skate. The Miller "S" Skate, Malleable Bottom, sent to any address on receipt of \$4.00. Liberal terms to the Trade.



Send for Circulars, and mention this paper, please.

(Concluded from page 1.)

all expansion, so that leaks are almost an impossibility. The ovens are made in small sections in order to better regulate the heating surface to the volume of air used at different times. The sections can be made

remain the same, or at least would not increase in cost proportionally to the number of pipes. I consider the 24-pipe oven very convenient, and therefore have based my estimate upon it. In designing new plants a safe rule would be to provide in the stoves 1 square foot of heating surface for every

A New Domestic Gas Machine.

The Eureka Light Mfg. Co., of Louisville, have for the past three years been engaged in perfecting their system of lighting by gas by their portable machines, and are now able to offer to the public what they consider

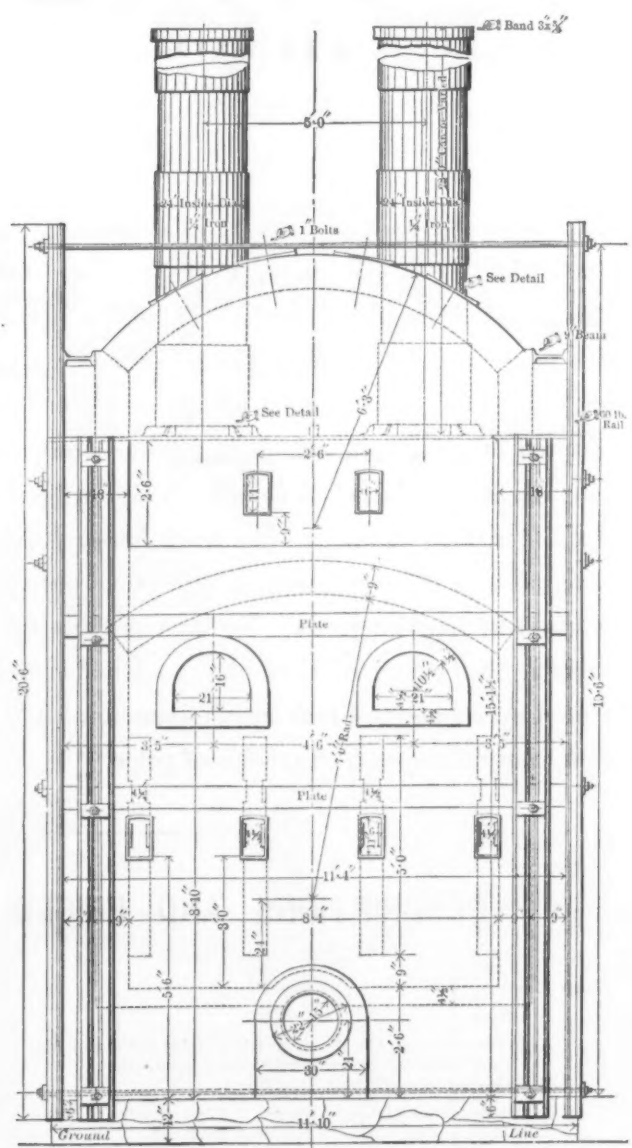
sible amount of evaporating surface is exposed to the oil, and the consequence is always a sufficiency of gas, the supply and demand always being equal, and the system of filling the evaporating pans is by first filling the top one to a certain height, the oil passing then through an ingenious arrange-

control in filling any one of the evaporating pans independent of the others, or of supplying depleted pans with fresh oil from the reservoir in the top of the generator. To accomplish such overflow pan-feed, draw-off and gauge, they only use four openings in the generator. The material used in the manufacture of gas is naphtha and oil, with which the generator is filled, no further attention being required after filling. The generator is located outside the building to be lighted, and the ordinary gas-pipe is attached to it that conveys the gas to the distributing-pipes and burners throughout the building. The power to force the gas out of the generator is an air-pump or blower placed in the basement or cellar of the building to be lighted, that is operated by a weight, a direct air pressure passes from this pump and through pipes connecting it with the generator. Here the air in addition to being the means or power to force the gas out of the generator is thoroughly mixed with the gas and passes out with it. The action of the pump is entirely automatic, the supply and demand being equal. The advantage in the pump over all others is the compound cog and double-spool gearing, which insures a perfectly steady and uniform pressure of air, which is absolutely necessary to obtain a steady light. The further function of the compound gearing is to run the pumps from 10 to 20 days longer than those used by other companies. The only attention required at all times to have the gas ready to light is to fill the generator twice a year, and wind up the weight which drives the pump every two to four weeks. This is as easily done as to wind a clock. No skilled person is required to attend to the machine, as the gas is all manufactured automatically, and only as it is consumed. The price of the gas is regulated by the price of coal oil and its products, so that at the highest price of petroleum the gas will not cost over 90 cents per 1000 feet. The average is 65 to 75 cents. The plant is inexpensive.

Trade with Mexico.—How to promote trade between the United States and Mexico is concisely told by Señor Navarro, Mexican consul in New York, who speaks first of the necessity of American firms being represented on the spot by persons familiar with the Spanish language and acquainted with the ways and wants of the people. The present immediate wants of Mexicans are agricultural implements, heavy machinery and tools. In recapitulating, Señor Navarro says: "There are two things necessary to development of trade with us. First, you must establish a permanent American colony in our midst, with branches everywhere. Your agents must dwell with us, learn our language and foresee our needs. When you have done this your merchants and manufacturers will know whom it is safe to ship goods to, and in no other way can this knowledge be obtained. I could not tell you now the standing of a moderately obscure firm without voluminous correspondence and aggravating delay. The next thing is to establish line of steamers which shall ply frequently between American and Mexican ports. If I could define the one all-powerful prerequisite I would say 'intimacy.' At present England has two or three lines of steamers connecting with us, one of which has been in operation for 45 or 50 years, at the outset involving heavy loss. There are also lines to Germany, France and Spain. Now, contrast this with the United States. There is only one line running between New York and Vera Cruz and New Orleans and Vera Cruz. This is the Alexandre Line, subsidized by the Mexican Government. With your unexcelled geographical position, all you have to do is to appoint suitable permanent resident agents in Mexico, ship your goods in your own bottoms to New Orleans, transfer to the Alexandre Line and establish your own connections for Vera Cruz; be friendly with the Mexican Central, cultivate our people and we will purchase from you. Our trade with you is three times as great as it was six years ago."

Montana Coal.—The mines at Timberline, in the Bozeman Pass, near the town of Bozeman, Mont., are now furnishing serviceable coal for locomotive use, the quality having considerably improved as the veins have been developed. This coal is now used almost exclusively on the North Pacific Railroad Company's divisions in Montana, and the locomotives on the Idaho division are being changed from wood-burners to coal-burners, with a view to its use there. Coal of still better quality has been discovered at a point about 25 miles from Ellensburg, in Washington Territory, and about 5 miles from the located line of the Cascade division. The report of the president of the North Pacific Railroad says that, if this division is completed to the vicinity of these deposits, it will doubtless be found advisable to build a spur track to the best working veins. This coal can then be used on both the Cascade and Idaho divisions with economy, and can be supplied for domestic use to all the towns in Eastern Washington, thus furnishing a large traffic to the road. In Eastern Montana and Dakota the locomotives burn largely the lignite coal mined at Sims, which when mixed with Eastern coals is an economical fuel. The railroad company also use coal from the Bull Mountain coal field, a few miles north of Billings, and the South Prairie mines, 25 miles east of Tacoma, on the western section of the Cascade division. The total cost of coal for the year was \$691,146.07, against \$959,797.46 for the preceding year. The expenditure for wood was \$56,572.38, against \$291,909.59 in 1884. The average cost of handling coal was reduced from 54 cents per ton to 27.6 cents per ton, and of handling wood from \$1.26 per cord to 96 cents per cord.

N. K. Fairbank & Co., of Chicago, are offering the trade a double-refined cylinder tallow, guaranteed to be free from acid, dirt, grit and water. This product is designed to meet the objections to the use of ordinary commercial tallow, in which free acid invites corrosion and the rapid wearing of brasses, cylinders, &c. The double-refined tallow is packed in barrels of about 300 pounds weight and is sold to the trade at 0 1/2 cents a pound.



Cooper Hot-Blast Stove.—Fig. 3.—Front View.—Scale, 1/4 Inch to the Foot.

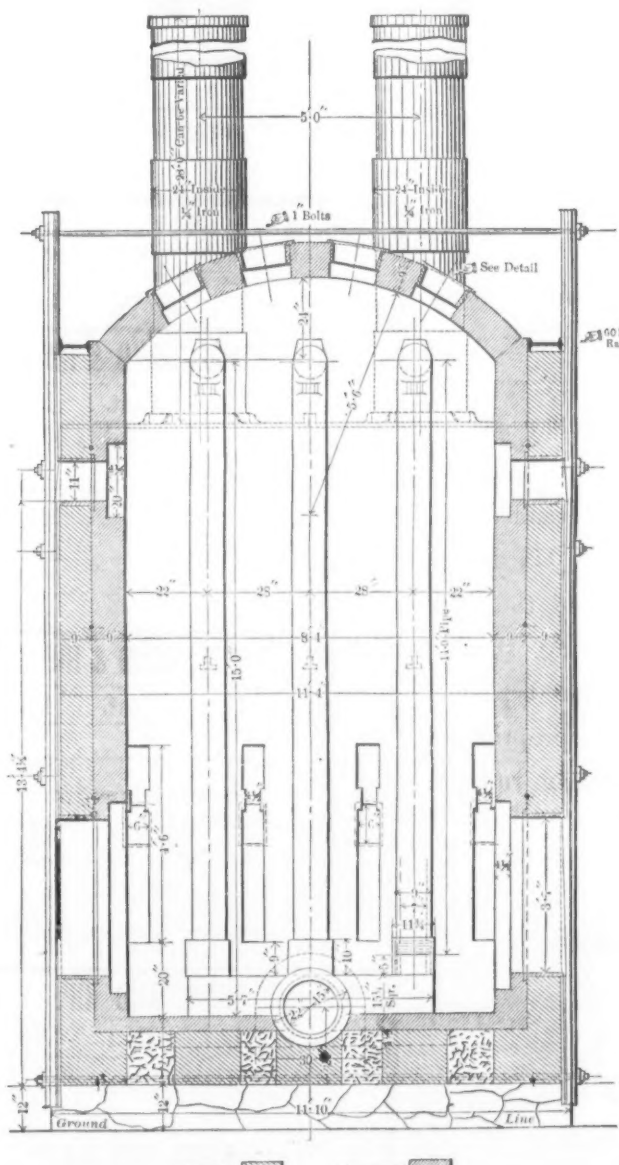


Fig. 4.—Sectional View.—Scale, 1/4 Inch to the Foot.

with either three or four rows of pipes, and with seven or eight pipes to each row. Each pipe has 65 square feet of heating surface, and it has been found at Durham that 100 pipes or 6500 feet of surface will heat 16,000 cubic feet of air (engine measurement) per minute, and that with regular running 950° to 1000° F. of heat can be maintained. The cost of one 24-pipe oven is \$3650. The details are as follows: In this estimate the price of 1 3/4 cents per pound for castings is the price now being charged to customers at the Durham Foundry. The price of \$26 per M. for fire-brick is \$1.40 more than the fire-brick actually cost. The Tyrone brick were purchased at an exceptionally low figure:

Detailed Cost of One 24-Pipe Durham Oven.		
Castings.	Lbs.	Lbs.
Twenty-four U-Pipes, 14 feet high, 9 inches outside diameter, 7 inches inside.....	2,400	57,600
Forty-eight sleeves.....	100	4,800
Two end bed-pipes.....	1,500	3,000
Twenty-one small bed-pipes.....	475	9,975
Two 16 inch connections.....	1,340	2,680
Twelve large doors and frames.....	335	4,020
Twenty-two small doors and frames.....	82	1,804
Four angle binders.....	620	2,480
Two chimney bases.....	1,000	2,000
Twenty-seven roof-frames and lids.....	185	3,645
Total.....		91,984

91,984 pounds castings, at 13 1/4 cents.....	\$1,099.72
Machine work.....	50.00
Freights to any reasonably near point, at \$1.50 per ton.....	69.00
25 M. hard bricks, size made at South Amboy, at \$8.....	300.00
20 M. 9-inch fire-bricks and shapes, at \$36.....	580.00
Laying 45 M. bricks, including helpers, erecting scaffolds, &c., at \$6.....	370.00
164 yards 90-pound old rails (9,240), at 1 cent.....	98.40
Two 9-inch beams, 22 feet 10 inches long, 1 1/2 inches high, at 3 1/4 cents.....	46.64
123 feet 1 1/2 inch binder-rods, nuts, &c., at 7 1/2 cents.....	61.87
Two smoke-stacks, 25 feet long, 24 inches diameter, 3-16 inch iron, 2,900 pounds, at 3 1/4 cents.....	101.50
Two 14-inch jet burners, at \$40.....	92.00
Two 15-inch gate-valves, at \$55.....	110.00
Eighty 1-inch bolts and nuts.....	6.00
Hemlock lumber for scaffolding.....	25.00
Lumber and carpenter-work for centers, labor, erecting pipes, binders, valves, smoke-stacks, making joints, calking, placing bed-pipes, &c.....	37.50
Iron borings.....	6.00
Lime, sand, fire-clay and kaolin.....	65.00
Ordinary foundation and excavation, 57 yards, at \$4.....	228.00
Add for contingencies.....	33.37
Total.....	\$3,650.00

Building two 24-pipe sections in one double stove, would save:

15 M. red bricks.....	\$8
Laying.....	5
Lime and sand.....	1
Total.....	\$14—\$210.00
Castings: 12 small and 12 large doors and frames, 4,800 pounds, at 1 3/4 cents.....	72.50
143 yards rails.....	80.40
1,110 pounds 9-inch beams.....	36.07
1,150 pounds rods, nuts, &c.....	35.87
Total.....	\$430.84

Two 24-pipe ovens, at \$3,650.....	\$7,300.00
Less above.....	490.84
Total.....	\$6,809.16

Cost of double stove with 48 pipes..... \$6,809.16
If 48 pipes cost \$6,809.16, one pipe with 65-foot surface would cost \$143.10.

2 cubic feet (piston displacement) of blast. A furnace making 500 tons of iron weekly would thus require 84 pipes, and the ovens for such a plant, say three 28-pipe ovens, disposed in one double and one single oven,

a perfect machine in every particular. Their machine may be described as follows: The generators are made of either copper or the best brands of Moorehead or Junata galvanized iron, and are of a capacity of from six

ment of a system of overflow pipes and cocks until the whole series of pans is filled. This system of filling the machine from an outside arrangement, where the action of the oil in process of filling the series

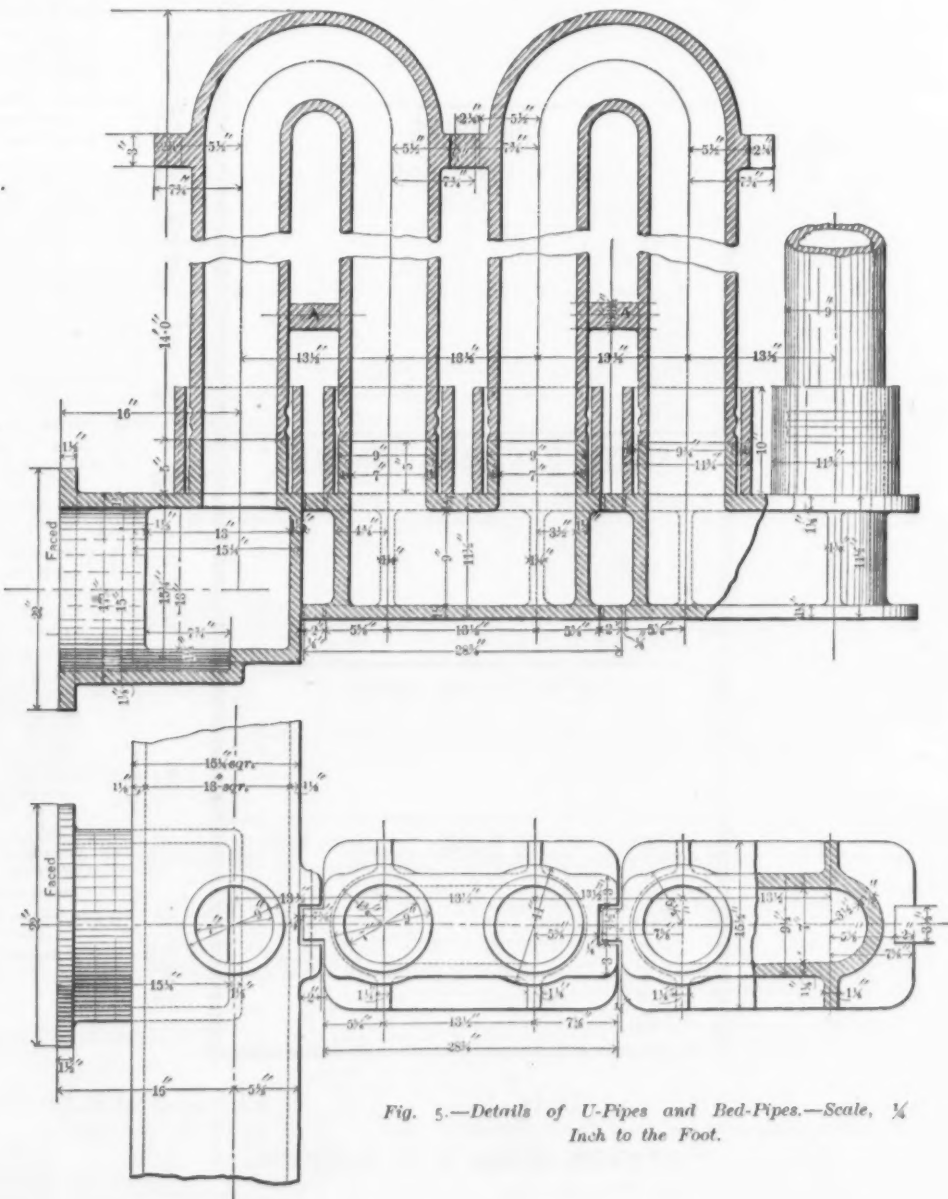


Fig. 5.—Details of U-Pipes and Bed-Pipes.—Scale, 1/4 Inch to the Foot.

would cost less than \$12,000. Two double-ovens, giving 112 pipes, would leave an extra section for contingencies. But this, however convenient, is not absolutely necessary. Pequet Furnace and Secaucus Furnace, N. J., have plants of 28-pipe Durham stoves, and the Andover Iron Works, Phillipsburgh, N. J., and Warwick Furnace, Pottstown, Pa., are building Durham stoves.

to 2000 lights, with all intermediate sizes. The interiors of said generators are subdivided into four to six shallow evaporating pans, and contain in each pan a wire frame circular in shape. That is covered with a material which acts with capillary attraction, and lifts up and assists the evaporation of the oil used. The internal arrangements of the machine are such that the greatest pos-

of evaporating pans, in addition to being entirely on the outside of the generator and in sight where they can be watched and controlled when in operation, and repaired should they get out of order, readily suggests the advantage over all with an internal overflow that necessitates a tearing to pieces of the generator should any part become inoperative. This overflow system gives absolute

ROOT'S HANDY CLOTH BOUND HARDWARE PRICE CARDS, FOR EITHER WHOLESALE OR RETAIL TRADE.

COPYRIGHTED 1885.

(CARD
No. 11-A.)

THESE CARDS COVER the lines having a large variety of sizes or numbers, avoid marking each package or article, in Retail Stores, and are very convenient for use in Wholesale Sample Rooms. They secure correct and uniform selling prices, pay for themselves several times a year by saving time, and are intended for at least ten years' constant use. Hence, no Hardware Dealer can afford to do without them, or spend the time required to write and rule out something similar by hand. They are printed in very distinct type, on the best *Byron Weston's Ledger Paper*, appropriately ruled with blue ink cross-lines and red ink down rulings,

DESCRIPTIONS AND PRICES.

Card No.	Size and Price Per Card.
1	A—BAR IRON, Weight of Round, Square and Flat, per Foot, and Tire per set. Western Classification and Prices of Extras on American, Norway and Swedes. 5½ x 18 in. 40c.
2	B—BAR STEEL, all Kinds and Sizes with Prices of Extras. Horse and Mule Shoes, Size, Weight, No. in Keg. Toe Calks. Cut Nails, List of Extras. 40c.
3	A—CUT TACKS, Exact size cuts. Length. Number in a pound. B—LARGE HEAD CARPET TACKS. Gimp and Lace Tacks. Hungarian Nails, Hob Nails, Blued and Tinned, American and Swedes. Exact size cuts shown of all the above. 3 x 13½ in. 30c.
4	A—SHOE NAILS. Cigar Box Nails. Copper Tacks, Double-Pointed Tacks and Cuts. Glaziers' Points and Cuts. Barbed Blind Staples. 3 x 13½ in. 30c.
5	B—PATENT BRADS. Finishing Nails. Blued Clout Nails. Tinned Clout Nails. 30c.
6	A—IRON WOOD SCREWS. B—IRON WOOD SCREWS (continued). Iron Machine Screws. 6 x 16 in. 40c.
7	A—STANDARD CARRIAGE BOLTS. B—STANDARD CARRIAGE BOLTS (continued). Plow Bolts. 3 x 13½ in. 30c.
8	A—MACHINE BOLTS. B—STANDARD TIRE BOLTS. Round and Flat Head Stove Bolts. 3 x 13½ in. 30c.
9	A—PHILADELPHIA CARRIAGE BOLTS. B—PHILADELPHIA CARRIAGE AND TIRE BOLTS. 3 x 13½ in. 30c.
10	A—SQUARE AND HEXAGON NUTS. Wrought Washers. Size of Bolt, size of Hole, Width, Thickness, number in 100 pounds. B—COACH OR LAG SCREWS. Superior and Norway Axle Clips. 3 x 13½ in. 30c.
11	A—BRIGHT SCREW HOOKS. Belt Hooks. Blake's Belt Studs. B—BRIGHT SCREW EYES. Gato Hooks and Eyes. Cornice Hooks and Eyes. 3 x 13½ in. 30c.
12	A—PLATE CASTERS AND BED CASTERS. B—WROUGHT HOOKS AND STAPLES. Trap Door Rings. Hasps and Staples, and Staples only. 3 x 13½ in. 30c.
13	A—SAWS, Hand, Panel and Rip. Combination and Back. Disston's and W. M. & C.'s corresponding numbers and "Our Brand." B—SAWS, Back, Compass, Pruning, Kitchen, Butcher's Bow and Blades, Framed Wood Saws and Blades. 3 x 13½ in. 30c.
14	A—CHISELS. Slicks, Socket Framing, Socket and Tanged Firmer, Corner. B—Turning Chisels and Gouges, Socket and Tanged Firmer Gouges. 3 x 13½ in. 30c.
15	A—CAST STEEL AUGERS AND BITS. Boring Machine Augers. Jennings' Auger Bits. B—BIT STOCK DRILLS. Gimlet Bits, German Pattern, Double Cut and Countersink. Center Bits. Clark's Expansive Bits. 3 x 13½ in. 30c.
16	A—HAMMERS. Adz Eye, Bell Face, Joiners', Steel Face and Claw, Riveting, Farriers', Blacksmiths', Machinists', Engineers'. B—HAMMERS. Tack, Masons', Sledges, Miscellaneous. HATCHETS. Shingling, Lath, Half, Claw, Broad or Bench, Hunters'. 3 x 13½ in. 30c.
17	A—FILES. Bastard, Mill, Flat, Hand, Half-Round, Round, Square, Knife, Warding. Second Cut, Mill, Flat, Hand, Half-Round. Smooth, Flat and Hand. 7 x 15 in. 50c.
18	B—FILES. Smooth, Half-Round, Round, Cabinet, Pit Saw, Hook Tooth, Gin Saw, Band Saw, Cant, Taper, Stubb's Taper. Rasps, Cabinet, Wood, Shoe, Horse. 3 x 13½ in. 30c.
19	A—Rubber and Hemp Packing. Gaskets or Rings. Rubber Hose. B—Leather and Rubber Belting. 3 x 13½ in. 30c.

SAWS.

DISSTON'S NO. 3. PANEL, HAND & RIP. W. M. & C. NO. 12.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
22				
26				
28				

DISSTON'S NO. 7. PANEL, HAND & RIP. W. M. & C. NO. 25.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
22				
26				
28				
30				

DISSTON'S NO. 8. HAND AND RIP. W. M. & C. NO. 26.				
Length In.	List.	Cost.	Job.	Sell.
26				
28				

DISSTON'S NO. 8. HAND AND RIP. W. M. & C. NO. 27.				
Length In.	List.	Cost.	Job.	Sell.
26				
28				
30				

DISSTON'S NO. 12. HAND AND RIP.				
Length In.	List.	Cost.	Job.	Sell.
26				
28				

OUR BRAND.				
PANEL, HAND AND RIP.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
22				
26				
28				

SPECIAL C. S. PANEL AND HAND.				
Length In.	List.	Cost.	Job.	Sell.
16				
18				
20				
26				

COMBINATION HAND.				
Length In.	List.	Cost.	Job.	Sell.
26				

DISSTON'S NO. 1. BACK. W. M. & C. NO. 5.				
Length In.	List.	Cost.	Job.	Sell.
10				
12				
14				
16				

for noting in pencil—List, Cost, Jobbing and Selling Prices—as in sample of Card 11-A, shown in the center of this page. Cards A and B of each number are mounted on each side of a tough, heavy card-board, especially adapted for this use, which is further protected on the four edges by being *cloth bound*. Two-thirds of them are 3 x 13½ inches. This size has been found convenient for hanging on a pilaster finish, or any other narrow surface, without hiding the goods. To hang or chain up each card there is firmly inserted through the top and center a nickel-plated eyelet about ½ inch inside diameter. They will be sent, *charges prepaid*, on receipt of price.

DESCRIPTIONS AND PRICES.

Card No.	Size and Price Per Card.
17	A—WINDOW GLASS. List Prices and No. Lights per Box. Also ruled columns for other Wholesale and Retail rates. B—SASH, DOORS AND BLINDS. List Prices. 6 x 18½ in. 40c.
18	A—HINGES, Strap, Light and Heavy. T, Light, Heavy and Extra Heavy. Hinge Hasps, Screw Hook and Strap. B—SCREW HOOK AND EYE HINGES. Barn Door Hangers, Checked Back, Kidder's Anti-Friction, Wrought Frame. Barn Door Stay Rollers, Rail, Pulls, Latches. Sliding Door Rail. 3 x 13½ in. 30c.
19	A—WROUGHT BUTTS, Narrow, Loose Pin, Light Inside Blind. B—LOOSE PIN BUTTS, Plain, Japanned and Plated Tips. 3 x 13½ in. 30c.
20	A—LOOSE JOINT BUTTS, Plain, Japanned and Plated Tips. B—TABLE HINGES, Branded Iron Blind Butts. Brass Butts, Narrow, Middle, Broad and Desk. Width when open given of all. 3 x 13½ in. 30c.
21	A—DOOR BOLTS, Barrel, Square Spring, Foot, Chain. B—DOOR BOLTS, Flush, Neck and Miscellaneous kinds. 3 x 13½ in. 30c.
22	A—SCREW DRIVERS, Flat and Round Blade, Ratchet, Clark's. Screw Driver Bits. Countersinks, Reamers, Belt or Saddlers' Punches. B—RULES. WRENCHES. 3 x 13½ in. 30c.
23	A—HOOKS, Coat and Hat, Wardrobe, Schoolhouse, Harness, Clothes Line. B—SHELF BRACKETS. DRAWER PULLS. 3 x 13½ in. 30c.
24	A—WOOD PLANES, Plane Irons, Cut and Double. B—PATENT PLANES. Patent Plane Irons. 3 x 13½ in. 30c.
25	A—WOODENWARE AND BASKETS. Alphabetically arranged. B—WOODENWARE (continued). Alphabetically arranged. 7 x 22 in. 70c.
26	A—PIECED TINWARE. Alphabetically arranged. B—STAMPED TINWARE. Alphabetically arranged. 7 x 22 in. 70c.
27	A—JAPANNED TINWARE. Alphabetically arranged. B—GRANITE OR AGATE IRONWARE. Planished Ware, Stove and Hollow Ware. All Alphabetically arranged. 7 x 22 in. 70c.
28	A—MORTISE DOOR LOCKS, Latches, Knobs and Escutcheons. B—RIM DOOR LOCKS, Latches, &c. 7 x 22 in. 70c.
29	A—PADLOCKS, Japanned, Wrought Iron, Branded Iron, Brass and Jail. B—COMPLETE COMPARATIVE LIST OF CORRESPONDING NUMBERS OF PADLOCKS, Mallory, Wheeler Co., Wm. Wilcox Mfg. Co., Russell & Erwin Mfg. Co., Norwich Lock Mfg. Co., Nimick & Brittan Mfg. Co. Revised to July, 1885. 6½ x 22½ in. 70c.
30	A—CABINET LOCKS, Drawer, Chest, Cupboard and Trunk. Cabinet Keys. B—COMPLETE COMPARATIVE LIST OF CORRESPONDING NUMBERS OF CABINET LOCKS, Eagle, Corbin, Parker, Gaylord, Revised to July, 1885. 7 x 24 in. 70c.
31	A—Length and number of Nails to the pound. Number of feet in a bundle of Hoop, Scroll and Band Iron. Number of feet of Wire in a pound. Coil or Cable Chain, weight per 100 feet and proof in tons. Bright Coil and Halter Chain and corresponding No. of wire. Sash weights and lugs required for common sized windows. B—MISCELLANEOUS TABLES. Showing number Copper Rivets and Burs in a pound. Size of Skates compared with Shoes. Scale Beams, poise or weight needed for each. Brass Kettles, size, weight and capacity. Strap and T Hinges, weight and number packed in a barrel. Comparative Nos. of leading makers of Roles and Levels. Revised to July, 1885. Manila Rope, feet in a pound, weight of coils, breaking strain, &c. 6 x 22 in. 70c.
32	Is adapted for filling in with any line of goods. It is ruled both sides with columns headed respectively "Description," "Size or No.," "List," "Cost," "Job," "Sell." 4 x 14 in. 20c.

LESS THAN A SET PRICED AT THE ABOVE RATES.

PRICES IN SETS.

Set No. 1. Includes all the numbers, 1 to 32 inclusive. Price, \$10.00 per set.
Set No. 2. Omits Cards Nos. 25, 26, 27, and includes all the other numbers described above. " 8.00 "

Set No. 3. For Dealers in Tinware and House Furnishing Goods, consists of Cards Nos. 25, 26, 27. Price, \$2.00 per set.
Set No. 4. Includes the following *Eighteen Leading Cards for Retail Trade*: Nos. 2, 3, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 28, 31, 32. " 5.00 "

SENT PREPAID ON RECEIPT OF PRICE BY

DAVID WILLIAMS, Publisher and Bookseller, 83 Reade Street, New York.

NINE REASONS WHY THE MUNCIE SKATE IS SUPERIOR TO ALL OTHERS.

- 1st. It is the only Adjustable-Bottom Skate manufactured.
- 2d. It can be changed from one size to another instantly.
- 3d. It is equal to four pairs of any other Skate.
- 4th. It has met with greater success than all others combined.
- 5th. It is the most durable.
- 6th. It can be made plain or scientific.
- 7th. It is the ONLY practical Rink Skate in America.
- 8th. It is endorsed by the finest experts and professionals in the world as being the finest movement.



**THAD. A. NEELY'S
MUNCIE SKATE.
PATENTED.**

**ADJUSTABLE BOTTOM.
MUNCIE IND.**

**THE ONLY PRACTICAL RINK SKATE
MANUFACTURED.**

SEND FOR CIRCULARS AND PRICES.

TESTIMONIALS.

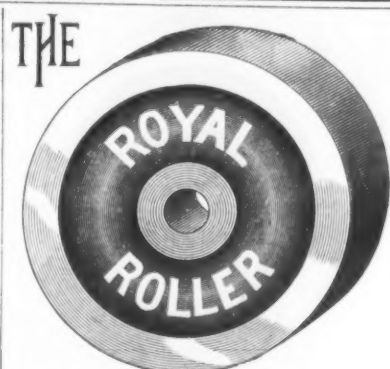
ROME, GA., Oct. 12, 1885.
Mr. THAD. A. NEELY, Muncie, Ind.:—Dear Sir: I have been engaged in the Roller Skating business for eight years, and during that time have tried many different skates, but find the MUNCIE SKATE much superior to all others for general use.
Yours respectfully,

O. D. CHARLES.

NEW ORLEANS, LA., Oct. 27, 1885.
Mr. THAD. A. NEELY, Muncie, Ind.: We have great pleasure in testifying to the merits of your MUNCIE

ROLLER SKATE. We have had ten years' experience in Roller Skating in many different countries, during which time we have seen and tested a hundred or more different patents. We have had your Skate in daily use now over two months, and have therefore given it a good, FAIR TRIAL, and can HONESTLY assert it to be superior to any we have used before. We are, dear sir, yours faithfully, LANE BROS. (English Professionals of London), English Roller Skaters, with W. W. Cole's Circus, U. S. America.

PRAIRIE DU CHIEN, WIS., Sept. 3, 1885.
THAD. A. NEELY, Muncie, Ind.: We have been using your MUNCIE ROLLER SKATE for the last three months, and have pleasure in stating that we consider it superior to any that we have previously seen or used, and we shall always recommend it as such. Yours faithfully,
CHARLES & LILLY FLETCHER,
(Fletcher's Trio of Skaters),
Russian Roller Skaters, with W. W. Cole's Circus.



After continual use in several of the leading rinks in the country, we guarantee that our Rollers are in any and all respects equal to box-wood rollers—and we believe superior. We can furnish these rollers at from 25 to 35 per cent. less in price than box-wood, and if you desire any of these rollers we must have your orders now to be filled two months later. A sample set furnished by mail for 50 cents. A superior quality of Sugar Wood bottoms also furnished at rock-bottom prices. Address

SPRINGFIELD MFG. CO.,
P. O. Box A. E. SPRINGFIELD OHIO

Palmer's Common Sense FRAME PULLEY.



Saves the User 50 Cts. Per Doz.

Mortising all done with a bit. No chisels or other tools required. By hand—eight to one. By power—twelve to one. The only Frame Pulley the Trade can handle with profit. The only Pulley users will buy after seeing this. Send for Circulars.

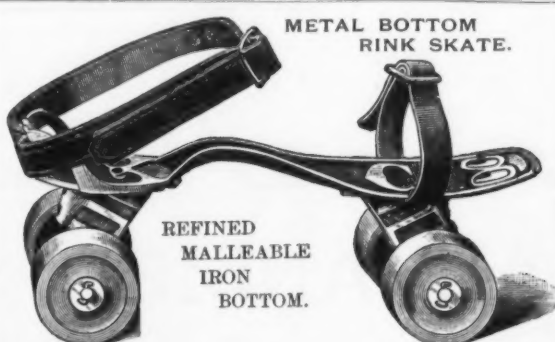
MANUFACTURED BY
Palmer Mfg. Co., Troy, N.Y.
Sole Eastern Agents,
PEABODY & PARKS, Troy, N. Y.

WOOD
BOTTOM
RINK
SKATE.

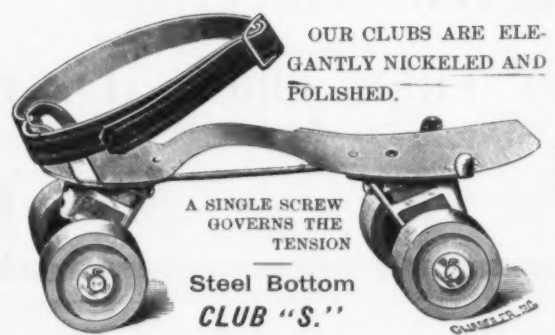
AS A RINK SKATE
THE PERFECTION
HAS NO EQUAL
On account of its
Fine Movement.

THE LADIES'
FAVORITE,
CLUB "C."

SIZES 1 AND 2 WEIGH
ONLY 3 POUNDS
TO THE PAIR.

METAL BOTTOM
RINK SKATE.

REFINED
MALLEABLE
IRON
BOTTOM.

OUR CLUBS ARE ELE-
GANTLY NICKELLED AND
POLISHED.
A SINGLE SCREW
GOVERNS THE
TENSION
Steel Bottom
CLUB "S."

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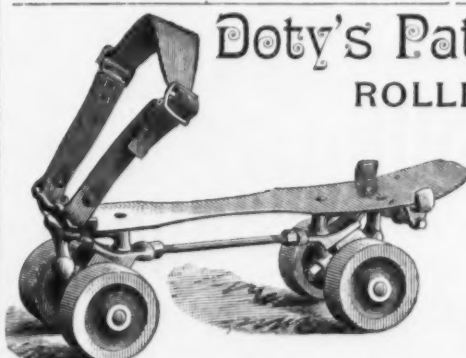
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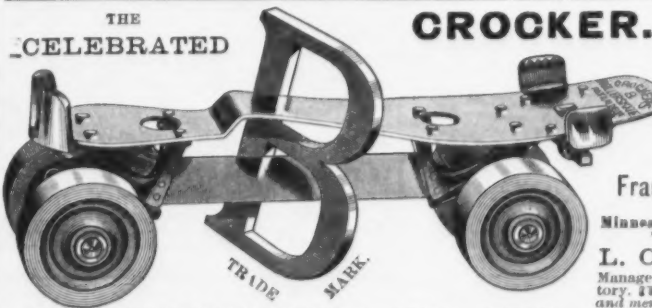
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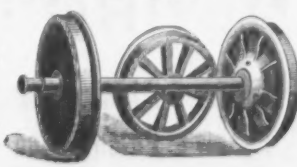
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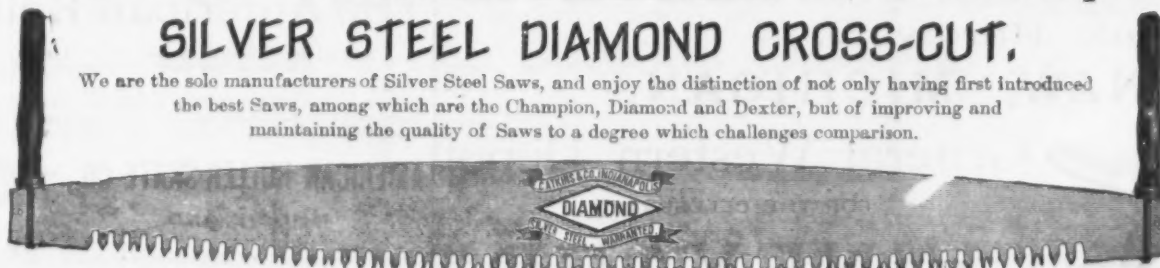
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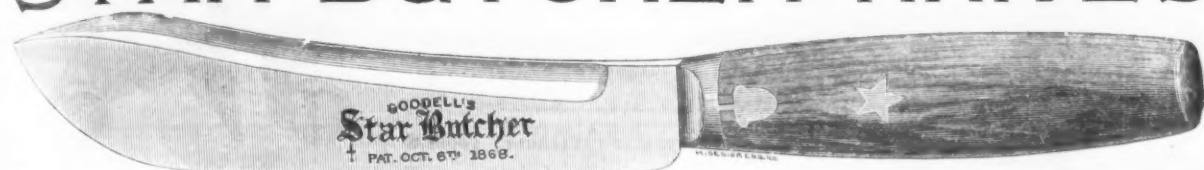
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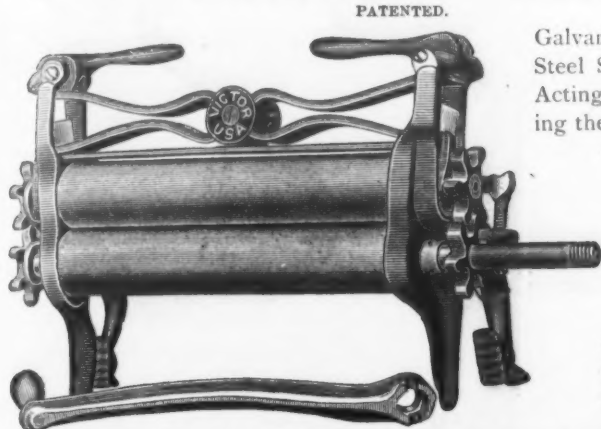
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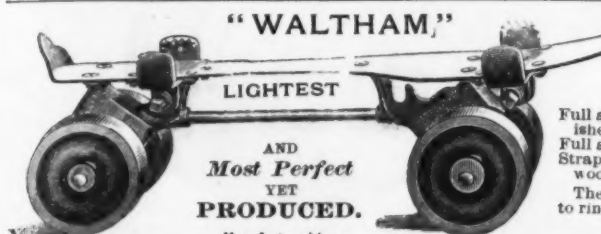
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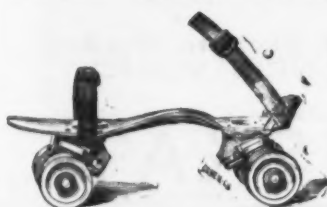
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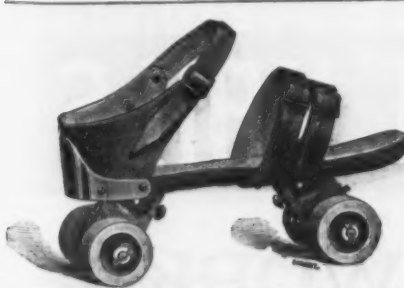
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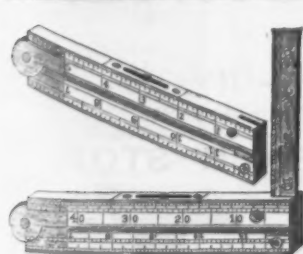
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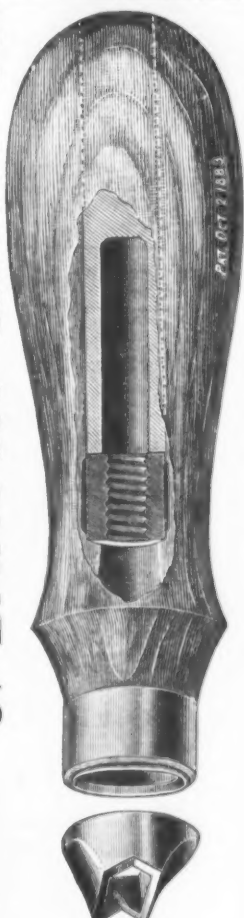
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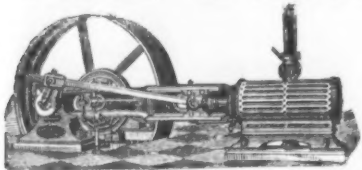
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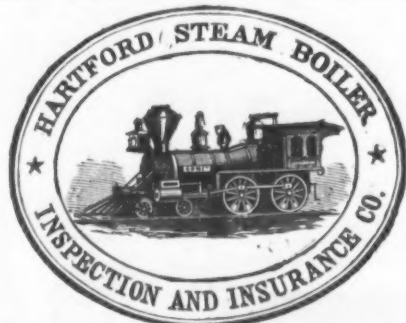


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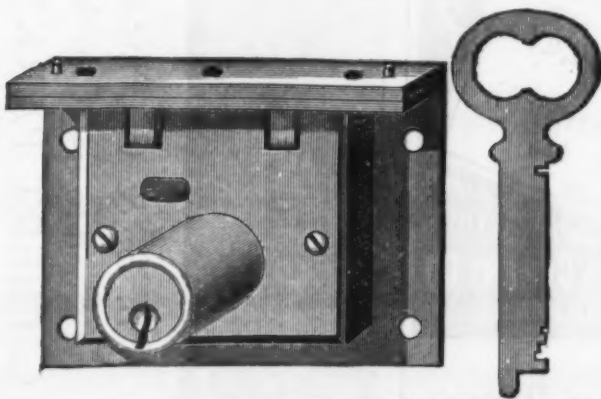
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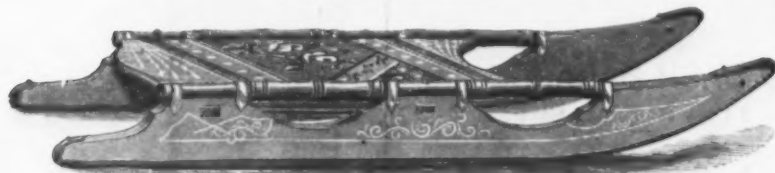


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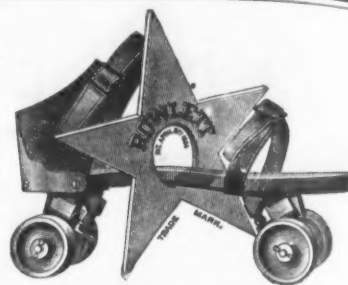
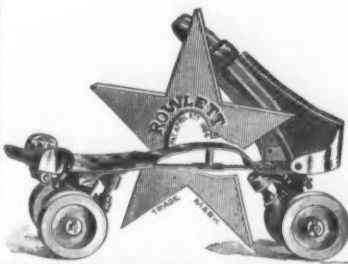
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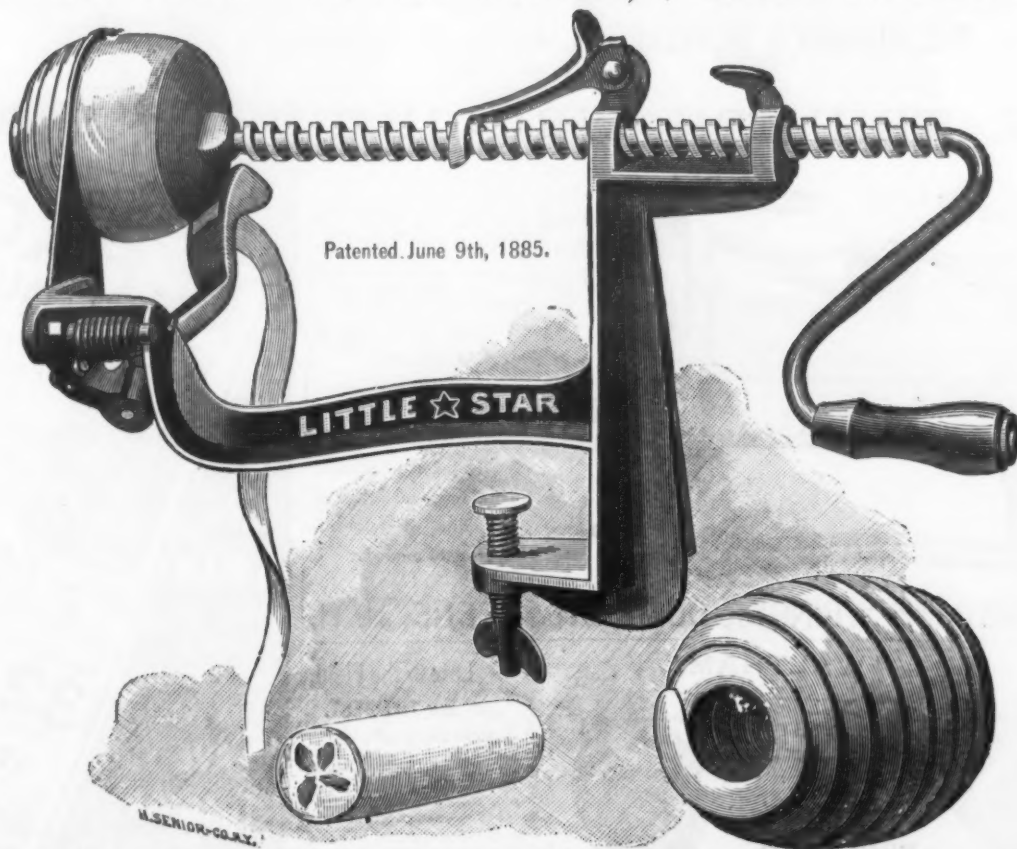
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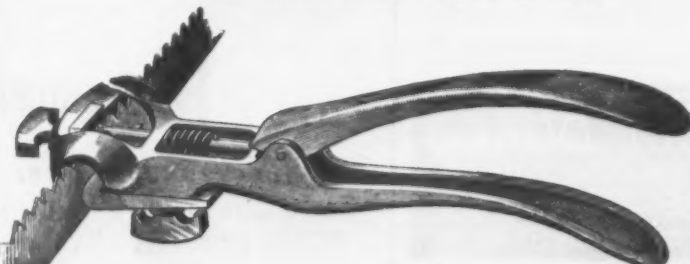
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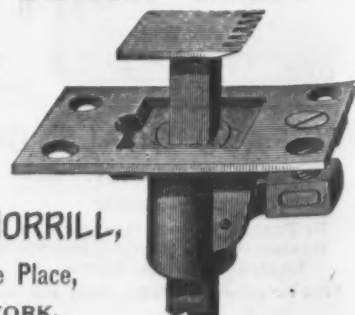
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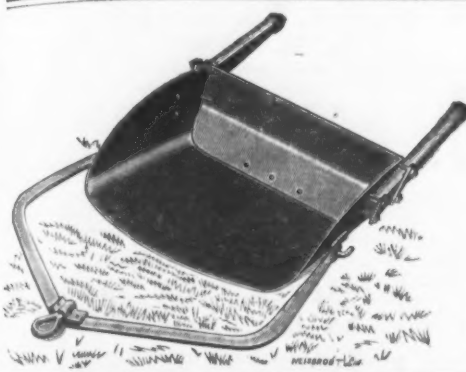
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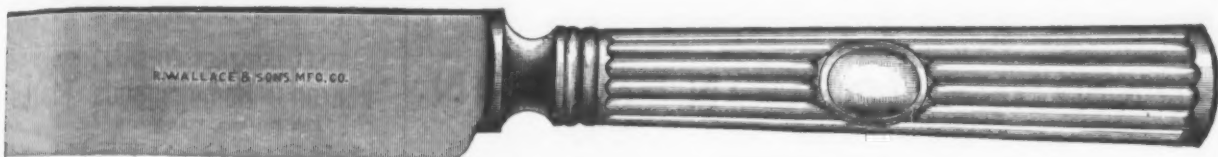
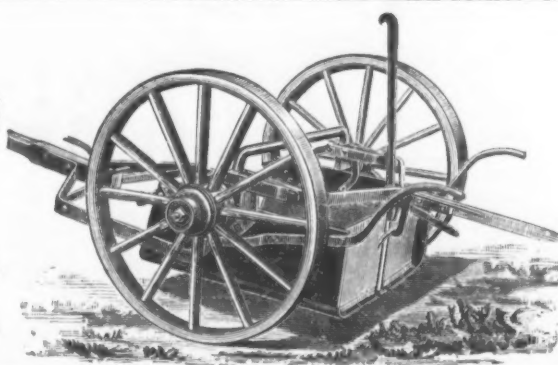
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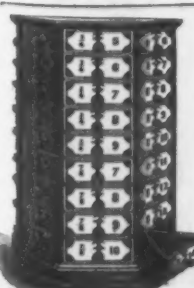
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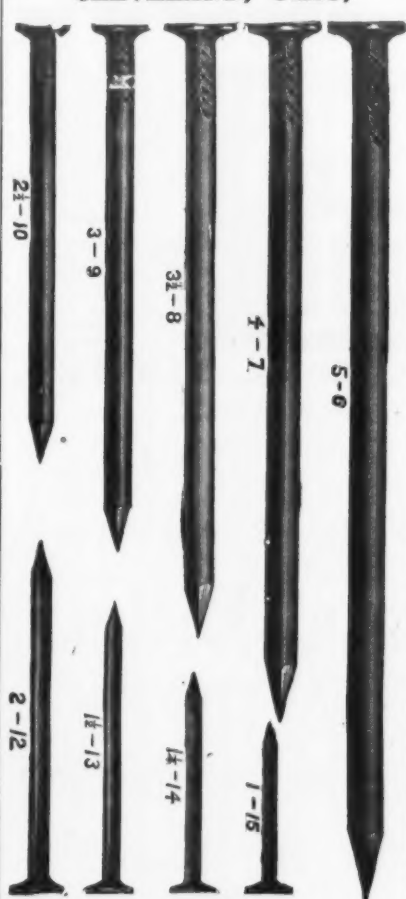
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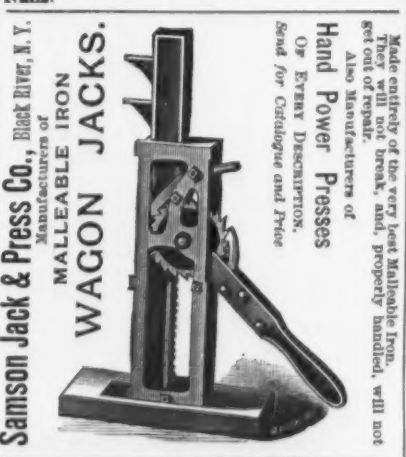
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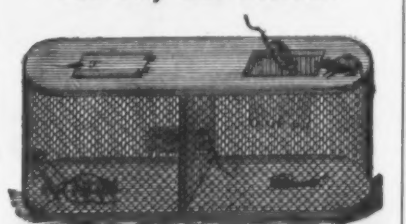
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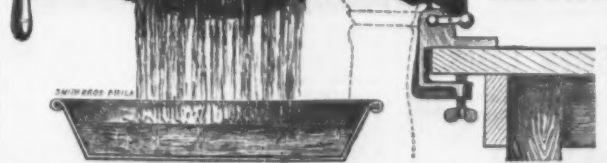
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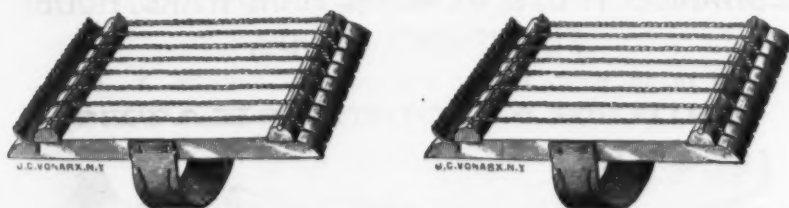
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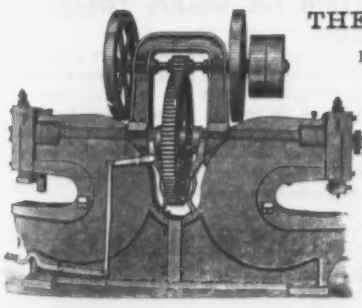
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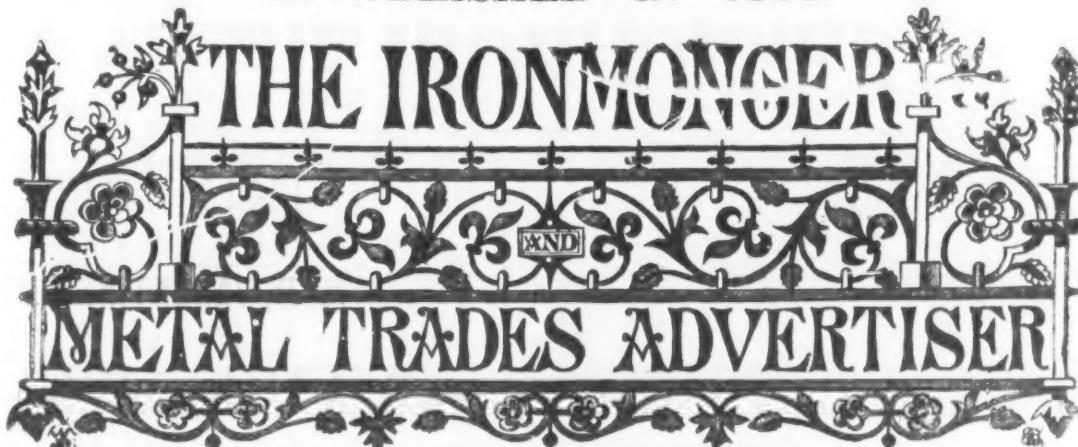
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With which is incorporated The Universal Engineer.

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OCTOBER 31, NOVEMBER 28, DECEMBER 26, 1895, JANUARY 23, FEBRUARY 20, MARCH 20, APRIL 17, MAY 15, JUNE 12, JULY 10, AUGUST 7, SEPTEMBER 4 and OCTOBER 2, 1896. This supplement is published in

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Swivel Hooks for Rope or Chain,
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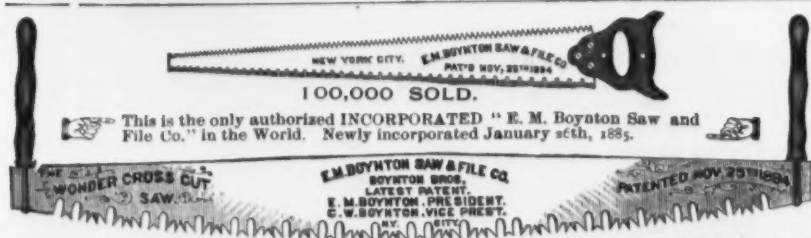
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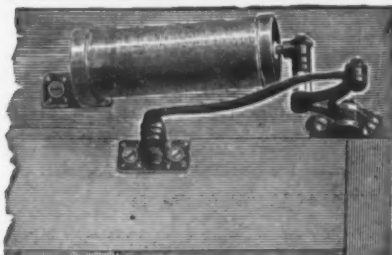


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GREAT REDUCTION IN PRICE.



The SHAW DOOR CHECK AND SPRING CO. have removed to their new factory, and with their increased facilities for manufacturing their goods have decided to reduce the price of each Spring \$1 from former list, and thereby bring the machine within the reach of all. The SHAW CO. are the owners of the oldest patented device for closing doors noiselessly, and with their new improvement produce the only check and spring which the trade can sell as general hardware. The same spring can be applied to either hinge or jamb side of both right or left hand doors.

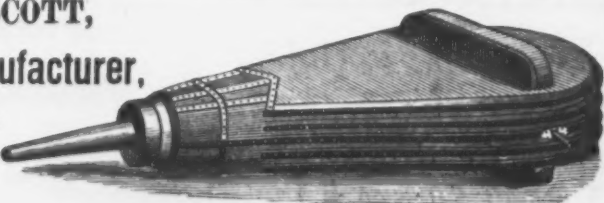
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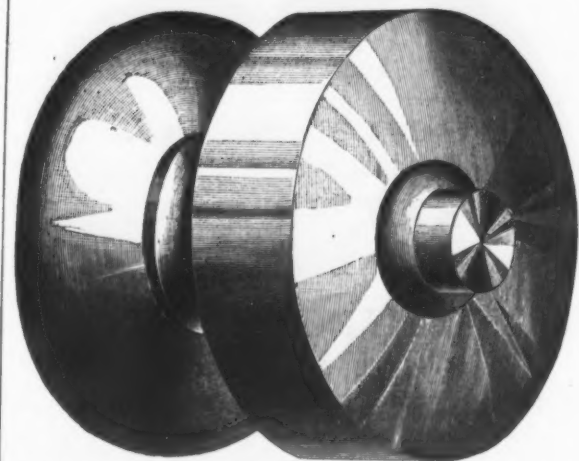
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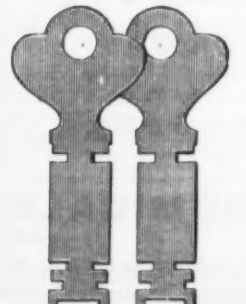
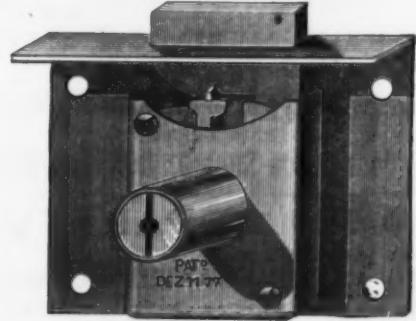
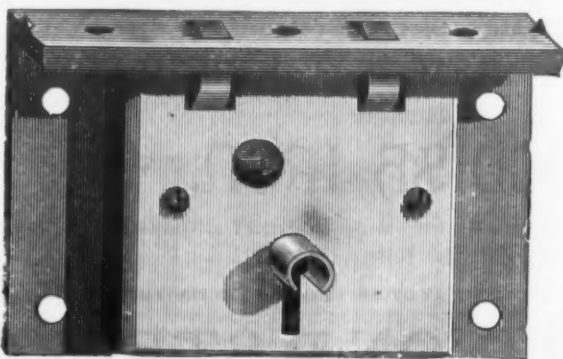
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Skates Made in This or Any Other Country.



SIZES, 6, 8½, 9, 9½, 10, 10½, 11, 11½, 12 Inches.

This Skate is simple in its construction, and has many advantages over other Skates. The new principle of operating the clamps gives great strength to the clamping of the heel. The pressure bar in front of the heel has a curved form, which braces the instep of boot or shoe, and prevents the turning of the foot while skating. The plates are of welded steel, carefully tempered and hardened. The superior care in tempering and workmanship gives the "Eureka" advantages that no other Skate has.

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WHITE MOUNTAIN ICE CREAM FREEZER.



The only Freezer ever made having three distinct motions, thereby producing finer, smoother Cream than any other Freezer on the market. Acknowledged by every one to be the best in the world. Over 200,000 in use to-day. Outside Irons Galvanized, but all inside the can coated with Pure Black Tin. Tube water-proof; easily adjusted and operated. We also carry large stock of Packing Tubs, Packing Cans, Ice Crushers, &c. Send for Price List and Trade Discounts. Address

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Terms, 30 days. For 60 or 90 days, interest added at 5 per cent. per annum.

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Peter Wright's, # 3, .09% @ 10¢
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Apple Parers.
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Lots of 10 to 25 dozen, special prices.

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Kentucky and Yankee, # doz. net \$6.50 @ 7.00
William Mann, # doz. net, .50¢ @ 7.00
Favorite # doz. net, .50¢ @ 7.00
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Double Bit Axes, # doz. net, .50¢ @ 7.00
Augers and Auger Bits.—New List January 7, 1885.

Smith's Augers and Bits, .00¢ @ 60¢
New Haven Copper Company, .00¢ @ 60¢
Benjamin Pierce Auger Bits, .00¢ @ 60¢
Jennings Auger Bits, new list, Jan. 1, 1884, .00¢ @ 60¢
Cook's Auger Bits and Augers, .00¢ @ 60¢
Smith's Ship Augers, .00¢ @ 60¢
Watrous Ship Augers, .00¢ @ 60¢
Bonney's Pat. Hol. Augers, list \$48 # doz. net, .00¢ @ 60¢
Searns' Pat. Hol. Augers, list \$48 # doz. net, .00¢ @ 60¢

Bellows.
Light and Common, .00¢ @ 60¢
Bells.
Burlingame, Mfg. Co. Light Hand Bells, list, 75¢ @ 80¢
Light Hand Bells, .80¢
Swiss Pattern Hand Bells, .80¢
Connell's Door Bells, .00¢ @ 60¢
G. Western & Kentucky Cow, new list, .00¢ @ 60¢

Boring Machines.
Upright, without augers, .00¢ @ 60¢
Angular, without augers, .00¢ @ 60¢
Belts.—Eastern Carriage Belts, new list, June 10, 1884, .00¢ @ 60¢
Philadelphia Carriage Belts, new list, .00¢ @ 60¢
Stanley, Wrought Shutter, .00¢ @ 60¢
Braces.—Barber's Improved, .00¢ @ 60¢
Barber's Old Style, .00¢ @ 60¢
Backus, Polished, .00¢ @ 60¢
Backus, Nickel, .00¢ @ 60¢
Spotted, .00¢ @ 60¢
American Bar, .00¢ @ 60¢
Amidon Improved, .00¢ @ 60¢
Amidon Corrugated, .00¢ @ 60¢

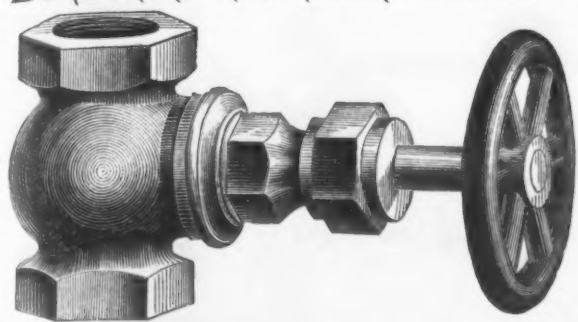
Butts.—Cast Fast Joint, .00¢ @ 60¢
Cast Fast Joint, Broad, .00¢ @ 60¢
Cast Loose Joint, Narrow, .00¢ @ 60¢
Cast Loose Joint, Broad, .00¢ @ 60¢
Cast Aorn, Loose Pin, .00¢ @ 60¢
Cast Aorn, Japanese, .00¢ @ 60¢
Cast Mayer's Loose Joint, .00¢ @ 60¢
Wrought Loose Pin, .00¢ @ 60¢
Wrought Table Hinges and Back Flaps, .00¢ @ 60¢

Wrought Loose Joint. .00¢ @ 60¢
Wrought Narrow Fast, .00¢ @ 60¢
Blind Butts.
Parker, .00¢ @ 60¢
Clark, .00¢ @ 60¢
Shepard, .00¢ @ 60¢
Lull & Porter, .00¢ @ 60¢
Huffer's, .00¢ @ 60¢
Casters.—Bed (new list July 1, 1880), .00¢ @ 60¢
Plate, .00¢ @ 60¢
Chains.—German Halter and Coll. list, June 1884, .00¢ @ 60¢
Galvanized Pump Chain, .00¢ @ 60¢
Best Proof Coll Chain, English, .00¢ @ 60¢

Chisels.—Socket Framing, .00¢ @ 60¢
Socket Firmer, .00¢ @ 60¢
Butcher's, .00¢ @ 60¢
Coffee Mills.—Side (new list Jan. 1, 1880), .00¢ @ 60¢
Enterprise, .00¢ @ 60¢
Cutlery.—Wheat Pocket, .00¢ @ 60¢
Pennsylvania Knife Co., new list net, .00¢ @ 60¢
Lansbury, Fray & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

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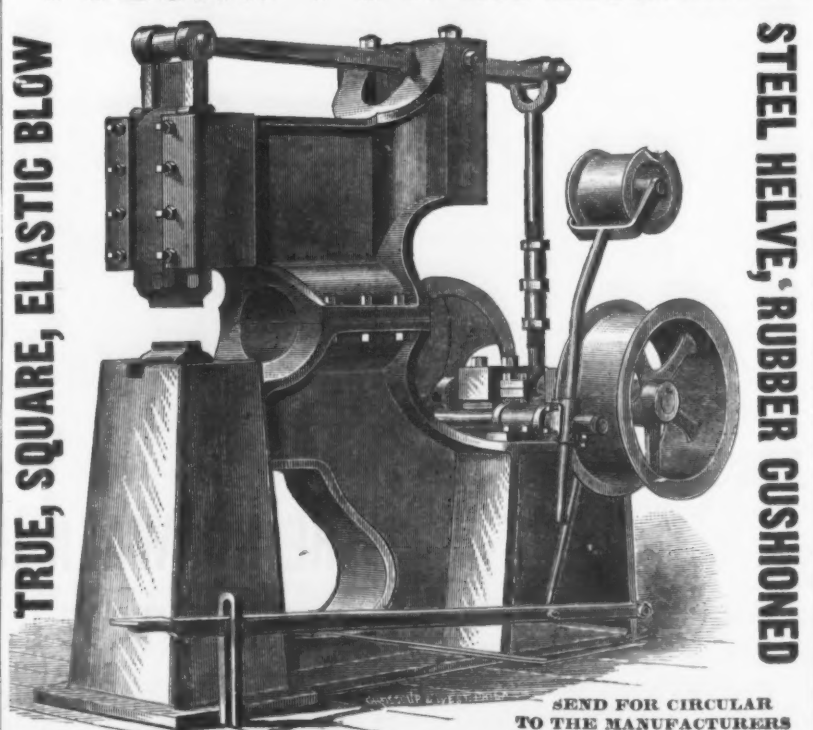
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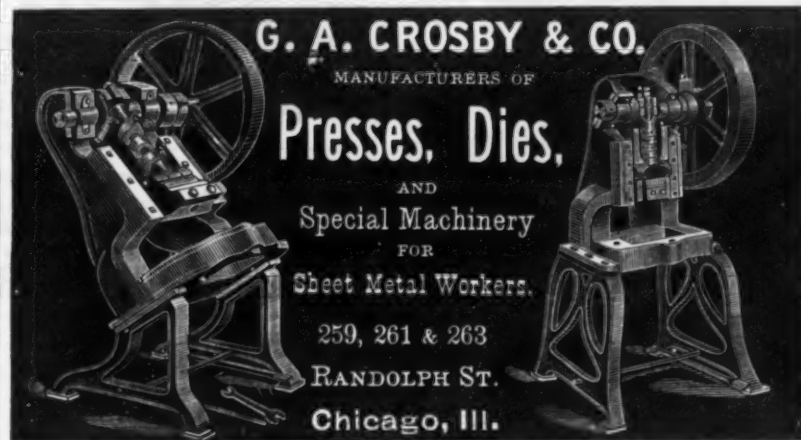


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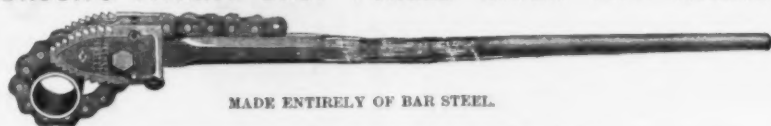
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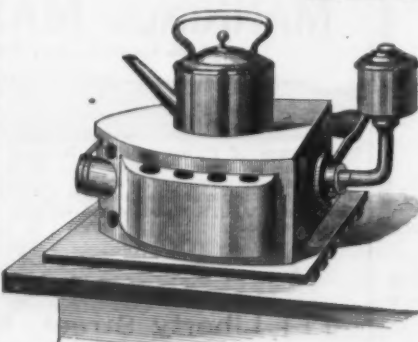
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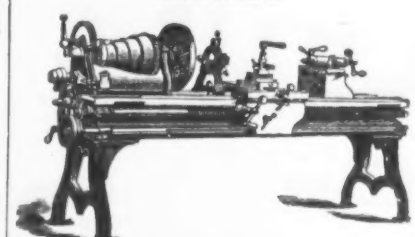
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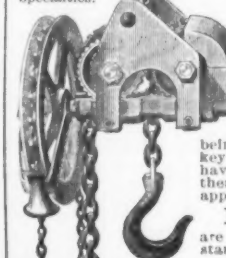
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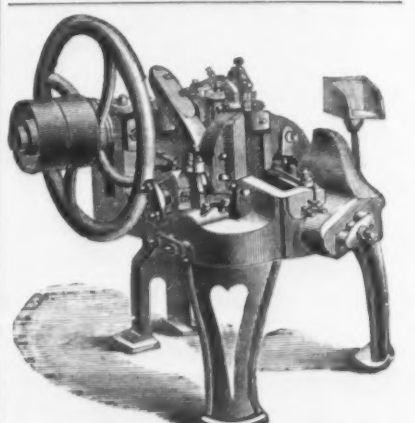
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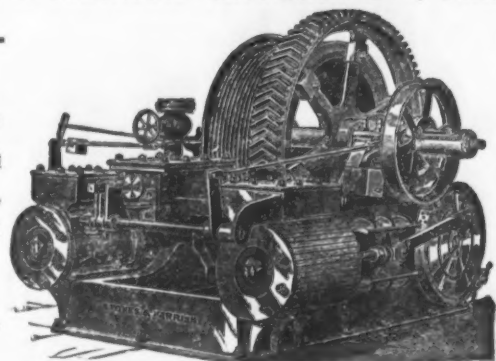


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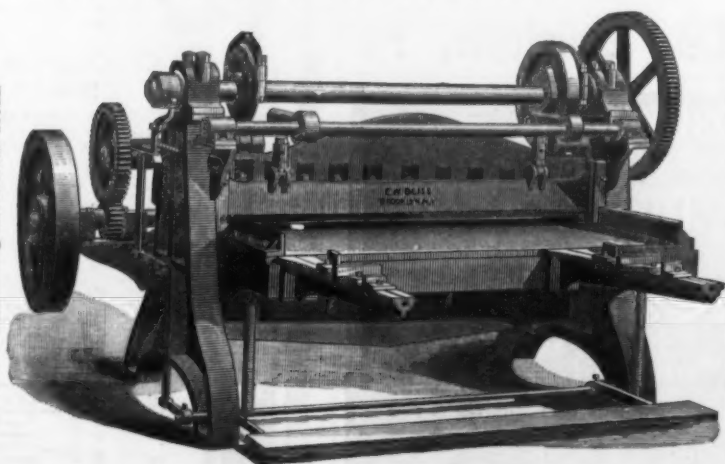
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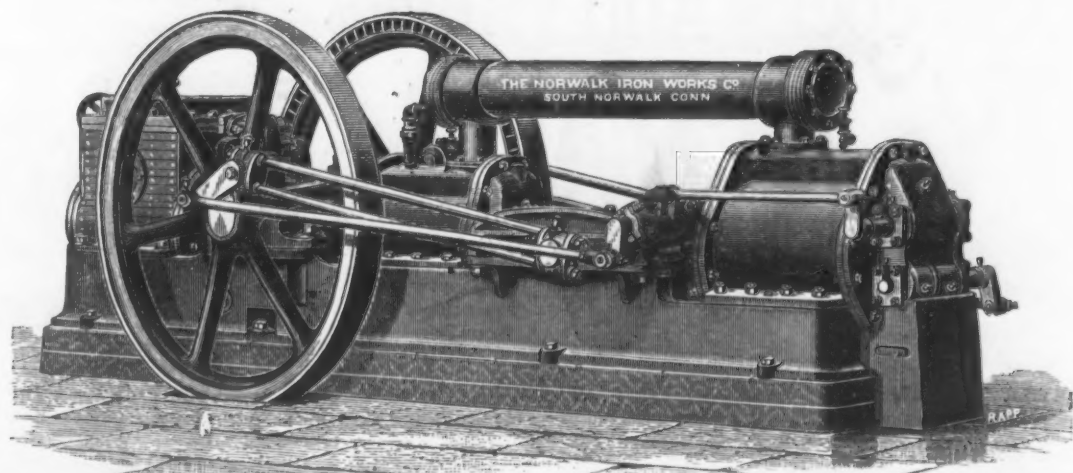
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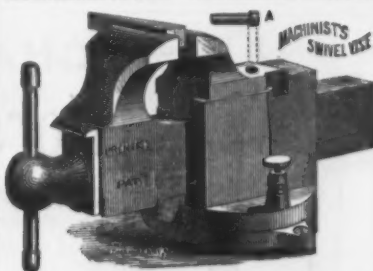
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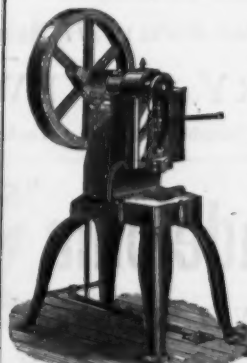
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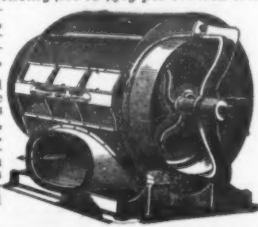
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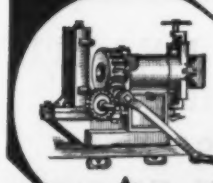
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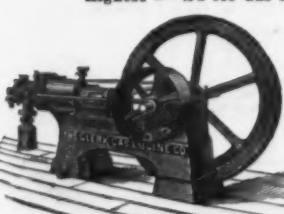
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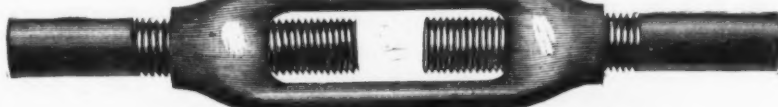
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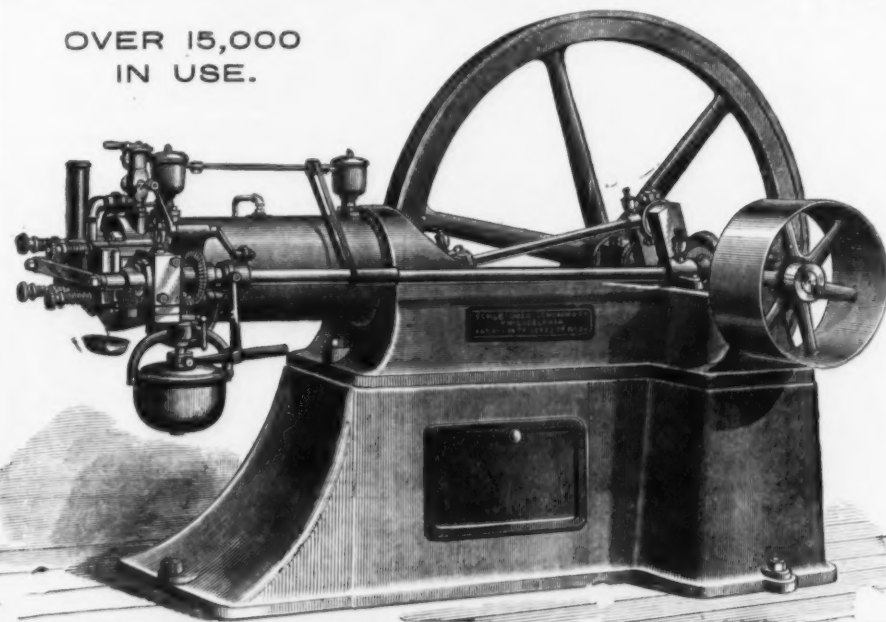
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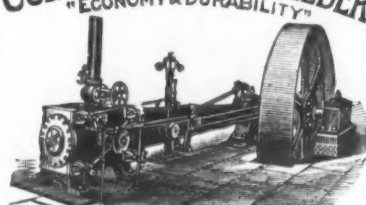


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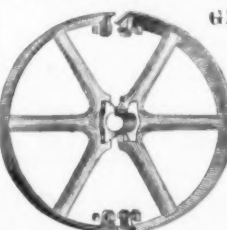
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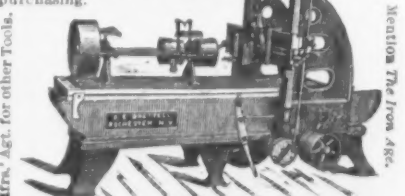
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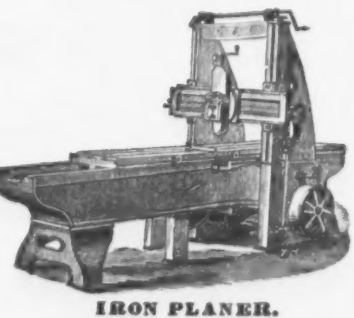
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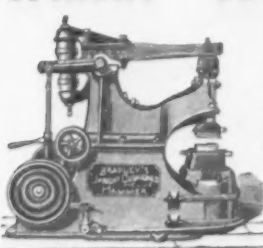
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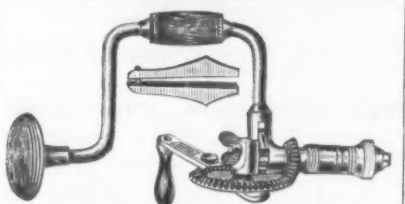
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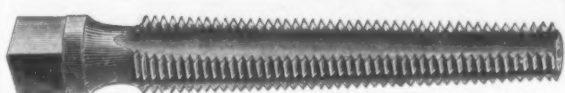
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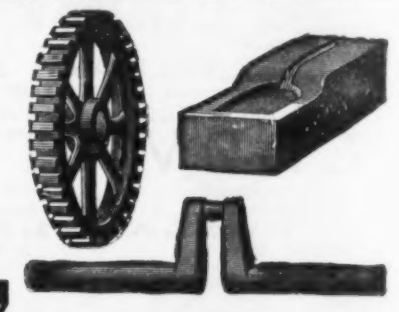


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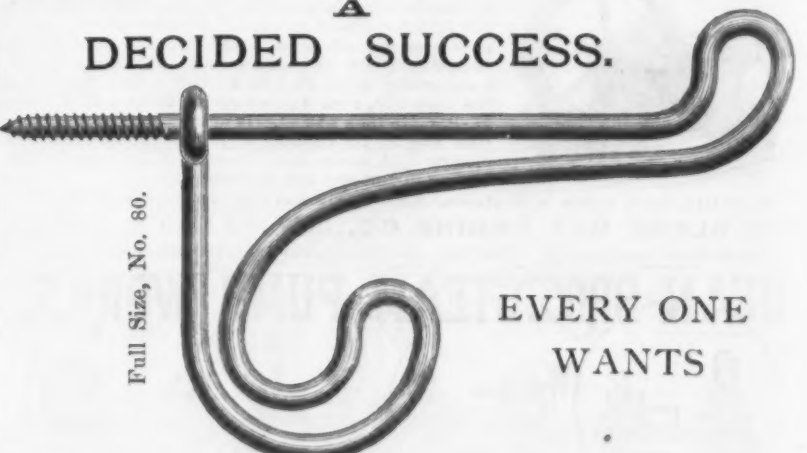
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